Engineering News, October 12, 1961

a tool for every task!

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Manufactured by WICKMAN LIMITED COVENTRY

No. 2 October 12, 1961

ENGINEERING NEWS

THE NEWSPAPER OF INDUSTRY • A HEYWOOD PUBLICATION

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Blade an invention of Firth Brown Tools Ltd. 143 SU

Every Thursday, Price 4d

World demand makes up for credit policy fall in home orders

MACHINE-TOOL EXPORTS BOOM

Reasons: vigorous sales drive, competitive prices, quick delivery

BRITISH machine tool companies are riding the wave of an export boom which they predict may go even higher. Substantial overseas orders from customers in West Germany, Japan and numerous other countries are raising the proportion of output for exports while home orders fall under the effect of Mr. Selwyn Lloyd's tighter credit policy.

Vigorous sales effort, competitive prices in a number of lines and delivery dates months shorter than those of competitors, particularly the West Germans, are among reasons advanced for the surge forward.

A spokesman of the Machine Tool Trades Association told Engineering News: "There is a very concentrated drive going on. It is obvious that the industry has been doing more thrusting."

From Coventry Gauge and Tool, Mr. H. A. V. Chapman, export sales manager, said: "Our exports are running at 51 per cent of total production of our main lines. Production for exports has been climbing for some months and is spread widely over very many markets."

Western Germany has now taken second place after India on the list of overseas customers for British-produced machine tools, with Japan among the first six. Performance and after - sales follow-up has given UK machine tools a substantial position in Japanese industry.

A William Asquith director said at Halifax: "We have £500,000 of orders for ram-type horizontal milling and boring machines, gear cutting machines and radial drilling machines to be delivered to Japan over the next 12 months."

Thirty-three per cent of William Asquith's production is now being exported.

Coventry Gauge and Tool are exporting measuring instruments of advanced design and thread grinding machines to Japan at the rate of £200,000 a year.

A spokesman for Alfred Herbert, Coventry, said: "We are now selling a good deal more abroad. We are making very large sales to overseas customers."

The company has delivery dates around 12 months ahead in its main lines. West German firms

● Contd. on Back Page

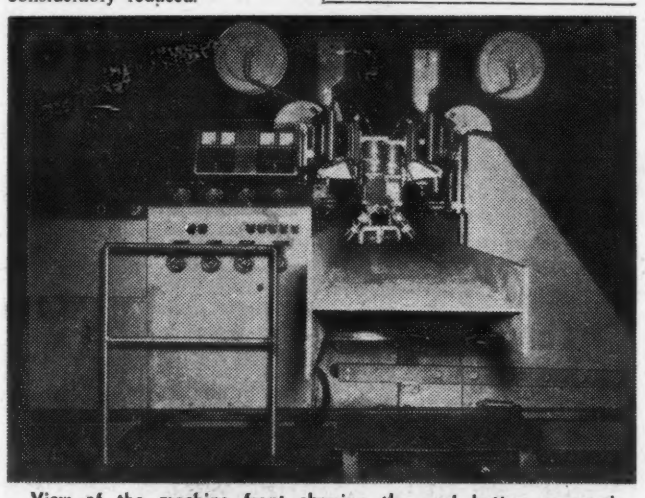
H-beams made on site

AN arc welding machine, claimed to be the first of its kind to produce beams of various profiles by an automatic welding process is being marketed in this country by Pullman AB, Gothenburg, Sweden.

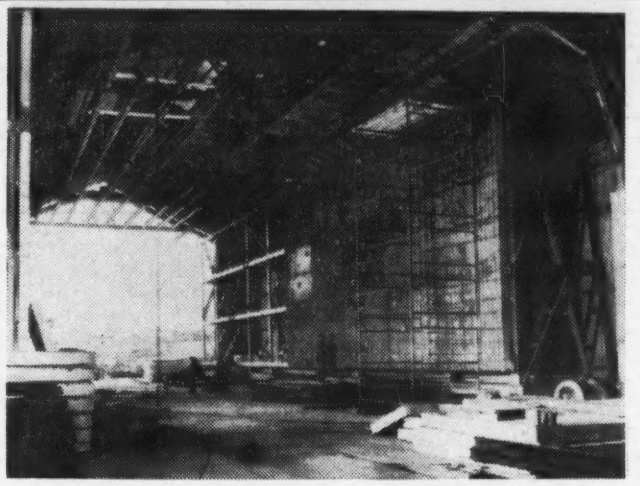
Beams are fabricated by this machine from plate pre-cut to the required thickness and length, and sections are then automatically welded together to form the desired profile.

A welded beam can be quickly and economically fabricated "on-site", and I-beams with heights between 12 and 60 in. produced.

The customary difficulties encountered in stock piling and storage space are expected to be considerably reduced.



View of the machine front showing the push-button operated panel. The unit is rated 900 amps and will handle wire sizes from 0.031 to 0.25in.



Head Wrightson's mammoth heat treatment furnace measures 27ft. square by 80ft. long. Designers are Cooper Electroheat Ltd., who supplied the panels and heating units.

Annealing furnace is largest in the world

AN electric stress-relieving furnace of over 58,000 cu. ft. capacity is being installed by Head Wrightson Teesdale Ltd., at their Thornaby - on - Tees works. This furnace, believed to be the largest in the world, is capable of stress-relieving large fabrications such as oxygen steel converters.

An important feature of the furnace is the complete absence of fire bricks. The hearth, walls and roof are constructed from 8ft. square mild-steel panels filled with compressed mineral wool.

Side walls are supported by triangular frames and mounted on wheeled bogies; these engage with floor rails and allow the walls to be retracted.

End walls are 27ft. square and lifted into position in two sections by mobile crane. Fabrications to be stress relieved are supported on cradles. These are carried by bogies which include the furnace floor in panel form, and traverse along the length of the furnace on rails.

Longitudinal expansion of the fabrications is taken up by individual bogies which move relative to each other.

To heat the furnace, 1,500kW electrical elements at mains voltage are employed.

ENGINEERS WELCOME THEIR OWN PAPER

THOUSANDS of engineers have welcomed the first issue of Engineering News, the modern weekly newspaper for this great industry, and orders continue to flow in by every post.

From all parts of Britain there has been an immediate response to its bright, newsy appearance and its authoritative articles and comment. The first circulation figure shows no less than

12,763

copies sold of the newspaper's issue in its first day or two on sale.

With its full technical, commercial and financial reports and expert staff, Engineering News is going from strength to strength, in England, Scotland, and Wales.

Readers of the newspaper are representative of all sides of the industry, from consultants to students and from electrical and light engineering to aeronautical, nuclear, shipbuilding and heavy engineering.

In this issue

Cast Iron Second to Steel
by Dr. H. T. Angus 11

Inside E.E.C.—Italy
by J. D. F. Perry 6

DEPARTMENTS

People In The News 4
Coming Events 4
American Letter 7
Education 8
New Patents 10
Foreign News 14
New Products 17, 18 and 19
Finance and Commerce 20, 21
Classifieds 22, 23

Make certain you get your own
ENGINEERING NEWS
every Thursday by completing the coupon on Page 23 TODAY.

BMC BRINGS BACK HORNET —AS A MINI-CAR

A FAMOUS name is revived with the introduction of a new Wolseley Hornet by the British Motor Corporation. The new model, with all-steel unit constructed body, is adapted from the BMC twins and carries the traditional Wolseley grille and illuminated badge.

The power pack is an 848cc transversely mounted four cylinder engine developing maximum torque at 3,450 r.p.m. A four-speed gearbox with synchromesh on second, third and top gears is provided with central floor change.

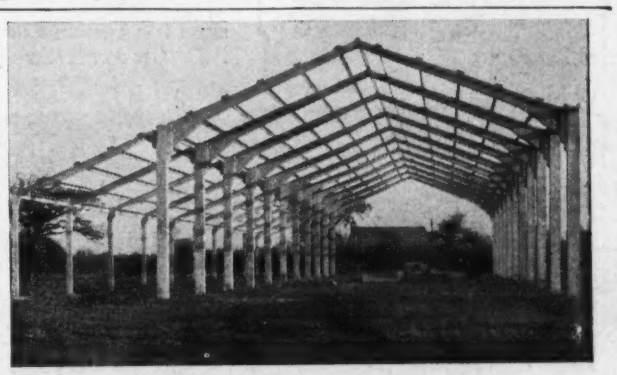
Transmission casing and oil sump are below the engine crankcase, with differential assembly mounted on the side of transmission casing.

Drive is transmitted to the front road wheels by universal jointed shafts. The single-plate dry clutch is hydraulically actuated.

Lockheed hydraulic brakes are fitted operating on 7in. diameter drums at front and rear with leading and trailing shoes.

Independent front and rear suspension is by rubber cone spring units. Hydraulic telescopic dampers are fitted front and rear. Steering is by direct linkage to steering arms.

The new Wolseley Hornet which is based on the ADO 150, has sound-deadening insulation on the main panels, bulkhead and wing arches.



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AVERY TEAM MEET EXPORT DEADLINE

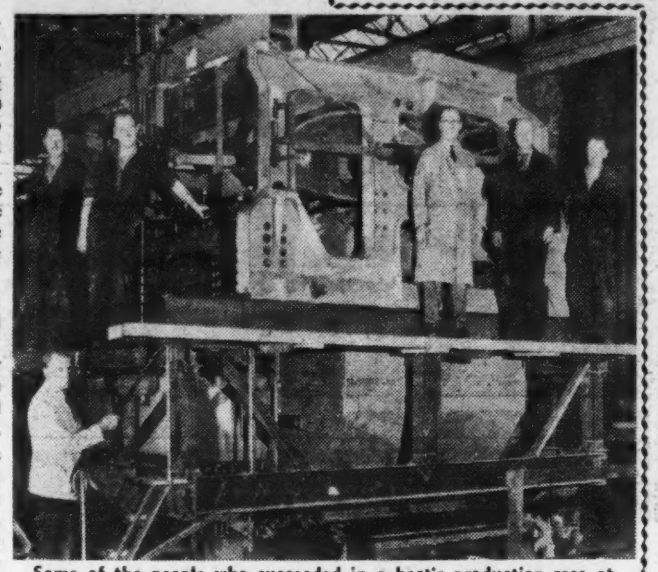
BIRMINGHAM scale-makers, W. and T. Avery Ltd., have just completed a hectic race against time to meet a £22,000 order from Canada for two 16-ton automatic grain weighing machines.

The order came from the Maple Leaf Milling Co., whose Colborne Port Mill on Lake Erie was destroyed by fire last November.

There was one stipulation; the machines must be delivered by the end of October 1961.

Now, three months after work began, the first machine is on its way and the second will be delivered to schedule.

Credit for this fine effort is given to the employees. An Avery spokesman said, "At a time when industrial disputes, strikes and working to rule make the headlines, it is gratifying to know that there are still those who are willing to work long hours."



Some of the people who succeeded in a hectic production race at W. and T. Avery. Two 16-ton automatic grain weighing machines were ordered at short notice by a firm on Lake Erie, Canada, whose mill had been destroyed by fire last November.

Electrical power-drive for space flights

U.S. DEVELOP PLASMA ENGINE

DEVICE CAN KEEP SATELLITE IN ORBIT FOR YEARS

A COMPACT, electrical space engine, capable of operating indefinitely by battery and solar cell power has been developed by the Republic Aviation Corporation U.S.A.

The lightweight engine, which obtains its thrust from the magnetic "pinching" of an inert gas such as nitrogen, was described by scientist Alfred E. Kunen, director of the company's Plasma Propulsion Laboratory, as "the only electrical engine in existence capable of operating today just as it will in actual use on spaceships and satellites."

He said the company expects to have a "flyable" model ready for space flight early next year.

During lab. tests direct thrust measurements were taken. These indicate a greater thrust-potential than that of any other electrical space propulsion system under development.

It meets practical requirements, both size and weight, for actual space ship and satellite use.

It can be operated continuously in near and deep space for years without the need of service of any kind.

Main advantage of the plasma engine over other forms of space propulsion is its light weight due to its efficient use of fuel.

High Efficiency

Its specific impulse, a term used to show efficiency of fuel consumption, ranges from 1,000 to 7,000 seconds. By comparison, the specific impulse of a rocket engine is in the order of only 100 to 350 seconds.

This means the plasma unit has the ability to operate over a much longer period of time. Comparing the plasma engine with other forms of electrical propulsion, advantages are greater thrust, broad range of exhaust velocity (specific impulse) in the required range for most space missions, stop/start capability, variable specific impulse and thrust performance during operation, simplicity, and inherent reliability.

The pinch plasma engine uses readily available inert gases for fuel. The fuel becomes ionized after injection into the engine and the resultant plasma is electromagnetically accelerated and exhausted from the nozzle at extremely high velocities.

It is the high velocity of the plasma which results in the unique, economical use of fuel.

Exhaust gas velocities of over 100,000 miles per hour and ejected gas temperatures in the order of 200,000 deg. F have been measured.

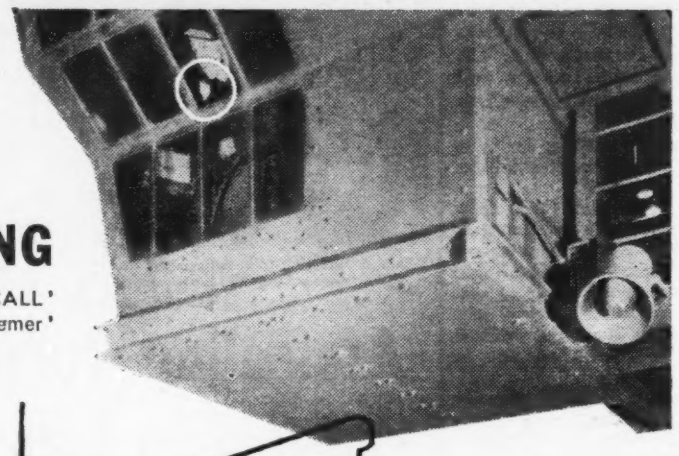
Relatively cool wall metal temperatures of 200 to 300 deg. F are maintained, eliminating need for auxiliary cooling effects.

There is negligible erosion of primary engine components and there are no moving parts.

Don't shout 'BINGO' every time you get your figures within the tolerances!

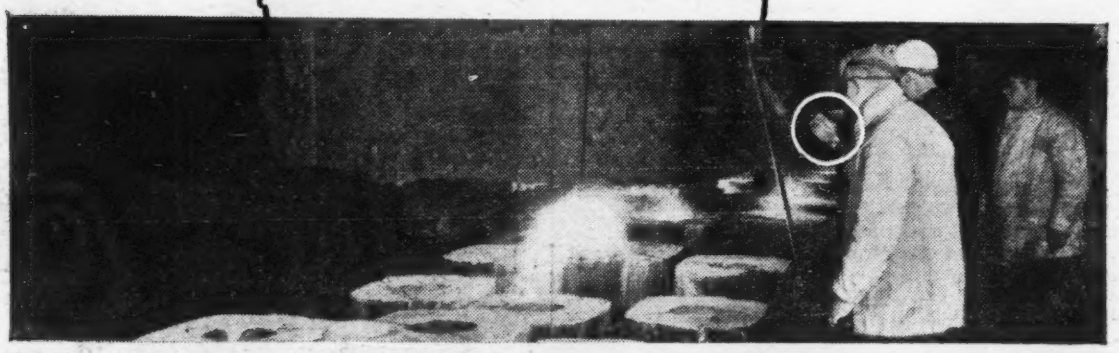
'SPOT ON' TEEMING

— is just one advantage when 'CLEARCALL' links the overhead crane driver and the 'teemer' on the shop floor.



LIKE THIS!

The 'loud-and-clear' speech-link of 'CLEARCALL' is ideal in delicate situations like this—where a massive hot metal ladle must be positioned with extreme accuracy for pouring molten metal into apertures that may measure only a few inches across! Have you a similar problem?



AEI 'CLEARCALL' COMMUNICATION SYSTEM
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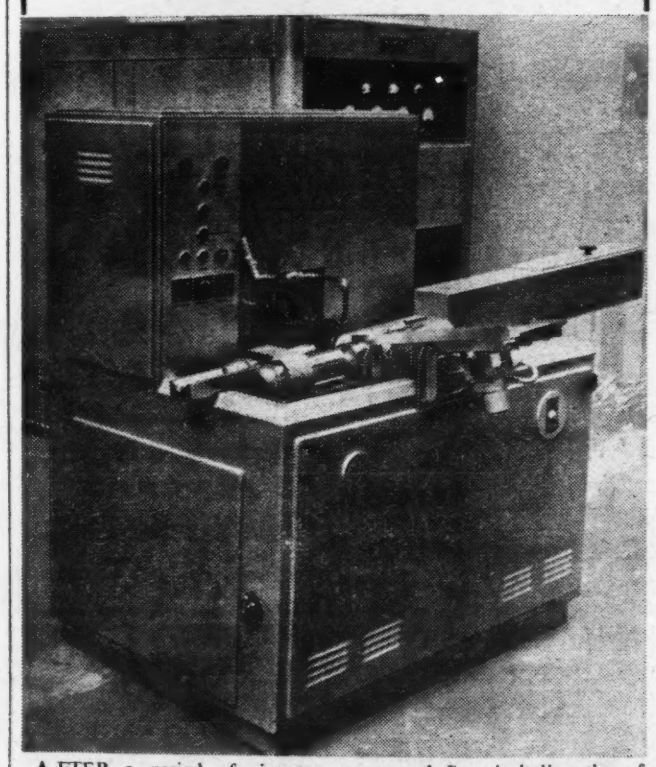
VAUXHALL'S BRING IN SPECIAL HARDENING PLANT



AFTER a period of rigorous checking Vauxhall Motors are using special induction heating equipment for the treatment of gearbox components used in the new Victor.

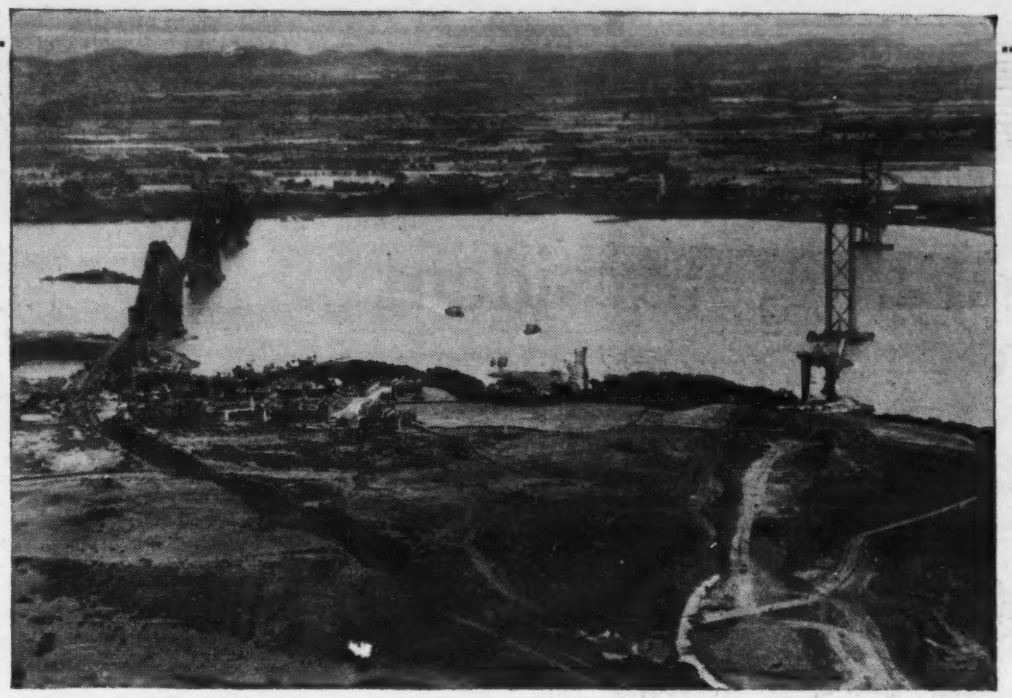
This consists of an induction heater, a recirculating unit for cooling water and an automatic horizontal shaft hardening machine.

All equipment is made by Delapena and Son, including the r.f. transformer for the hardening machine. The latter is made by Fritz Dusseldorf of W. Germany for whom Delapena are British agents.

The equipment is the first of its type to be installed in Britain. The area, depth and degree of hardness can be accurately controlled and maintained over long production runs.

PROGRESS IN PICTURES

Forth road bridge



Photograph by James Muncie of County Newsphotos, Motherwell.

Welding box sections used in building the two main towers.

THIS aerial view from the Fife coast shows the new Forth road bridge under construction. The approach road is being built in the foreground.

Contractors for the superstructure are the A.C.D. Bridge Co., a partnership comprising Sir William Arrol and Co. Ltd., the Cleveland Bridge and Engineering Co. Ltd. and Dorman Long (Bridge and Engineering) Ltd.

The bridge is being constructed for the Forth Road Bridge Joint Board. Consulting engineers are Mott, Hay and Anderson, and Freeman, Fox and Partners.

About 6,000 tons of high tensile steel were used in the completed 512 feet high twin towers.

The 132 box shaped sections were welded with British Oxygen Fusarc marine deck equipment. Two machines in tandem welded two corners at once to prevent distortion (picture top right).

When finished, the bridge will have more welding than any other suspension bridge in the world.

A vital part of general construction is the provision of twin footwalks. These will have a total span of two and a half miles and will allow the main cables to be spun and suspenders for the deck sections to be fitted.

They are floored with Weldmesh panels (pictured bottom left), supplied by the B.R.C. Engineering Co. of Stafford. These have two inch by three inch centre to centre mesh with 6 s.w.g. wires at two inch centres and 4 s.w.g. wires at three inch centres. At the sides galvanised Weldmesh panels are fitted and secured to the floor.

The footwalks will have an incline of 23 degrees in places and timber stringers will be fixed at intervals to give workmen a foothold. They will also serve to prevent friction between the wires forming the main cables and the footwalks.

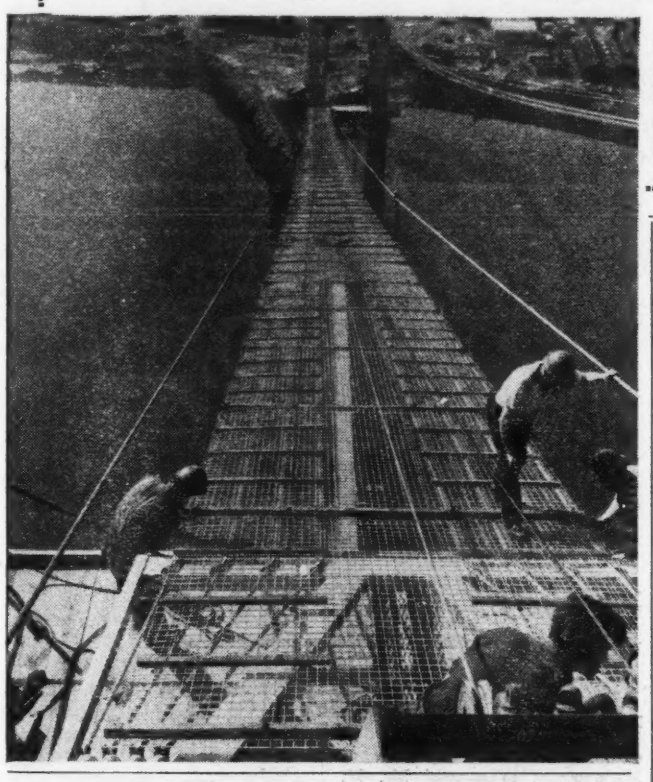
The finished bridge will not require a constant army of painters to battle with corrosion.

Prior to erection, all steel is treated with the Ferrodor metal protection system. Developed by Griffiths Bros. and Co., London, it is based on the use of micaceous iron oxide as a paint pigment.

When combined with a Ferrodor paint the pigment particles are flat and interleave rather like the scales of a fish.

Steelwork is first zinc-plated to a thickness of 0.003 inches. After an initial primer three different coats are applied, each having a phenolic resin based medium.

The frequency of repainting is expected to be considerably reduced.



Fitting timber stringers to weldmesh panels on main footwalk.

SCHLUTER DEVELOPS UNLOADING DEVICE

METHODS of loading wagons and trucks with silage, hay, and grain have been highly developed, but suitable apparatus to unload has received less attention.

To meet this need, Schluter of Germany have, after practical experiments, been able to develop a simple device which unloads trailers rapidly and easily.

A discharge board placed at the front end of the trailer body is attached to a roller at the back end of the body by means of chains running horizontally along the floor.

By rotating the roller by the Schluter Abladefix, the board is pulled back and at the same time pushes the heaviest of loads in front of it.

The rate of discharge can be varied by means of a two-step V-belt drive to suit the capacity of the conveyor on to which the load falls.

Driven by an electric motor, the supply can be either A.C. mains, or to the battery of a tractor when using a D.C. motor.

U.S. STEEL MILL INSIDE E.E.C.

AMERICA'S United States Steel Corporation is to manufacture stainless steel mill products in Italy and sell them within the Common Market.

They announced this week that they have signed an agreement to form a new Terni-Societa per l'Industria e l'Elettricita. Stainless steel is in high demand throughout Western Europe.

The company will build a mill at Terni which will be operating by 1963.

The announcement marks a bold departure for the profit-squeezed American steel industry and particularly for United States Steel, the nation's leading producer of the basic metal.

It is the first overseas steelmaking venture for "Big Steel", although many of the nation's major producers have long mined iron ore abroad.

End strikes plan proposed

A NEW deal in industrial relations through the formation of a National Security Authority was proposed by Mr. I. M. Stewart in his presidential address to the Institution of Engineers and Shipbuilders in Scotland this week.

The Authority would create a national wage structure, provide pensions and other services, run convalescent homes, and supply houses on hire purchase.

Trade unions wishing to benefit would have to ensure freedom from strikes, ballot rigging and restrictive practices.

He maintained that such a body, acting as a large public trust, would lead to major advances, including a truly democratic trade union structure.

Security

"In spite of views to the contrary," Mr. Stewart said, "there is much evidence in this country and elsewhere to confirm that the average worker is more concerned with security than anything else, and much more than those in higher income groups.

"His roots are deep in the quicksands of industry, where inevitable changes of fortune take place. Jobs evaporate and new ones appear.

"While, generally speaking, he notes that in any reshuffle, management remains intact, he regards as inevitable that these disturbing forces will be brought to bear sooner or later on his personal affairs."

Mr. Stewart considered that the Authority should be financed from the taxes of industrial profits on a fixed percentage basis.

If the government argued that no tax diversion could be afforded it should think again. There is no purpose more urgent than a protective investment in the basic security of the working population.

This is nothing to what goes on inside a

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NOPUMP SPRAY BOOTH

In this new type of Water-Wash Spray Booth the exhaust air travels at very high velocity over the water surface entraining water. The air/water mixture, moving through controlled changes of direction, provides the scrubbing action.

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Lack of adhesion of deposits

Smooth, easily cleaned surfaces

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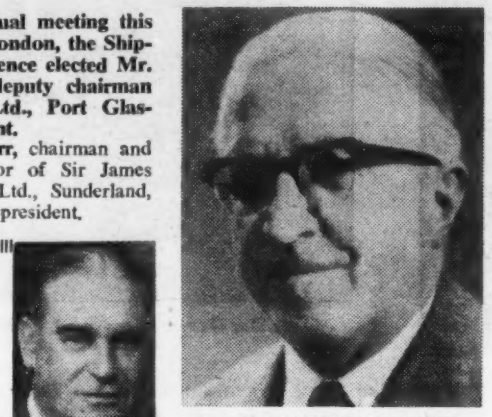
PEOPLE in the NEWS

Shipbuilding Conference elects Mr. A. H. White, president

AT their annual meeting this week in London, the Shipbuilding Conference elected Mr. A. H. White, deputy chairman of Lithgows, Ltd., Port Glasgow, as president.

Mr. A. J. Marr, chairman and managing director of Sir James Laing & Sons, Ltd., Sunderland, was elected vice-president.



Mr. ALEXANDER H. WHITE, C.B.E.

MR. A. J. MARR

Mr. White succeeds Col. T. E. Smith, chairman and managing director of Smith's Dock Co. Ltd., South Bank-on-Tees and North Shields, who was elected president of conference two years ago.

☆

The Minister for Science has appointed five new members of the Council for Scientific and Industrial Research.

They are: **Mr. L. H. Bedford,** an electronics engineer and director of Research at A. C. Cossor Ltd. from 1931-1947. For eleven years he was chief engineer in the guided weapons division of English Electric Co. Ltd. He took up his present appointment with the company two years ago.

Geoffrey B. R. Fielden joined Ruston and Hornsby Ltd., immediately after the war; was appointed chief engineer of the turbine department in 1949; and engineering director five years later.

He left to join Hawker Siddeley Brush Turbines as managing director in 1959. He has been a member of the British Transport Commission Research Advisory Council since 1956.

After nine years at London University, where he became assistant professor of organic chemistry, **Mr. E. R. H. Jones** was the Sir Samuel Hall professor of Chemistry at Manchester University from 1947-1955. He was appointed to his present chair in 1955.

Professor of Mechanical Engineering at Imperial College since 1946, **Mr. O. A. Saunders** started his career with DSIR. He is immediate past-president of the Institution of Mechanical Engineers and was for many years chairman of the propulsion committee, Aeronautical Research Council.

Mr. H. C. Tett joined the Esso Petroleum Co. Ltd., in 1928 and was appointed manager of the Technical Department seven years later.

MR. G. B. R. FIELDEN

PROF. O. A. SAUNDERS

During the war he served on the Technical Advisory Committee, Petroleum Board and in 1947 became managing director of Esso Research Ltd. He has held his present post for two years.

☆

Mr. J. B. Simpson, mining consultant to Anglo-French Exploration Co. Ltd., has been elected president of the Institution of Mining and Metallurgy for 1962-63.

Mr. Simpson joined the Institution as a student in 1921, and was elected associate member in 1927 and a member in 1944. He served on the council from 1951 to 1958 and has held office as a vice-president since 1959. He takes office in May 1962, in succession to Mr. A. R. O. Williams.

MR. H. C. TETT

☆

Matthews and Yates Ltd., Cyclone Works, Swinton, Manchester, manufacturers of fans and air treatment plant have appointed four assistant directors.

They are: **Mr. L. Barton, Mr. A. B. Crompton, Mr. G. L. Jacques** and **Mr. L. Winstanley.**

Messrs. Barton, Crompton and Winstanley are engineering executives at the head office in Manchester, and Mr. Jacques works in a similar capacity in the London office.

☆

Two board appointments in the steel division of the BSA group of companies are announced, both on the sales side.

Mr. A. H. Mills joins Jessop-Saville (Small Tools) Ltd., of Rotherham as sales director.

Mr. F. A. Lytton joins Jessop-Saville Ltd., Sheffield, as export sales director.

He joined the company in 1952 as an overseas technical representative. Later he became export manager.

☆

Babcock and Wilcox Ltd. announce that **Sir Eric Mieville** is retiring from the chairmanship of Dewrance & Co. Ltd. on December 31, 1961. The present deputy-chairman, **Sir Donald Perrott** will succeed him.

Sir Francis Evans is also retiring from the board.

Mr. J. B. W. Cunningham will be managing director from the end of January. Mr. Cunningham is at present managing director of the Engineering Group of the United Kingdom Atomic Energy Authority.

MR. T. LEWINS

Mr. C. R. Tearne, formerly sales manager of Churchill Gear Machines Ltd. of Blandon-on-Tyne, has been made a director.

Other new appointments: **Mr. W. Guss,** technical sales manager, **Mr. T. Lewins,** chief machine tool designer; and **Mr. P. Wedgewood** chief engineer.

☆

Cox and Danks, a company in the Metal Industries Group have appointed **Mr. H. Stewart** to the board.

Mr. Stewart joined the company in 1938, and he was successively manager of the Broadheath, Cheshire depot, and Pendleton, Salford branch manager.

☆

Mr. C. A. C. Bulpitt, director and general manager, Carreras Ltd. has been appointed chairman of the South East Regional Council of the British Institute of Management to succeed Mr. M. Ormerod, chairman of Batchelors Foods Ltd.

MR. P. WEDGEWOOD

Coming EVENTS

THIS WEEK

Ends today
Electronic Computer Exhibition and Business Symposium, National Hall, Olympia, London.

Until October 21
International Knitting Machinery and Accessories Exhibition, Belle Vue, Manchester.

October 12 - 13
17th Colloquium on Hardening, Wiesbaden, Germany

October 13-21
German Industrial Exhibition, Berlin.

October 13-22
International Mechanical Handling Exhibition, Paris.

October 16-18
International Conference on the Metallurgy of Beryllium, Royal Commonwealth Society, Craven Street, London, W.C.2.

October 17-19
14th Engineering Display, Royal Horticultural Society's New Hall, Westminster, London.

October 17-19
Plastics Show of Canada, Toronto.

October 17-21
French Metallurgical Society Meeting on Metal Forming, Paris.

October 17-26
Industrial Equipment Exhibition, City Hall, Manchester.

October 18-26
International Motor Exhibition, Earls Court, London.

October 19-20
12th Symposium on Corrosion in Nuclear Technology, Paris.

October 26-November 5
Los Angeles 39th International Automobile Show.

October 30-November 3
Symposium on Welding in Shipbuilding, Institute of Marine Engineers, Mark Lane, London, E.C.3

October 31-November 1
Conference on Engineering with Plastics, The Plastics Institute, 6 Mandeville Place, London, W.1.

October 31-November 2
10th Canadian National Packaging Exposition, Toronto.

November 7-12
Sixth Meeting and Review of Automation and Instrumentation, Milan.

November 8-10
Testing in Electrical Engineering, Savoy Place, London, W.C.2.

November 10-18
43rd Scottish Motor Exhibition, Kelvin Hall, Glasgow.

November 13-16
Seventh Annual Conference on Magnetism and Magnetic Materials, Phoeniz, Arizona.

November 13-16
National Maintenance Conference and Exhibition, Central Hall, Westminster, London.

November 13-18
International Factory Equipment Exhibition, Earls Court, London.

November 13-18
Second Engineering Materials and Design Exhibition, Earls Court, London.

November 15-29
29th Building Exhibition, Olympia, London.

November 22-27
Fifth Conference and Exhibition on Automation and Instrumentation

November 27-December 1
Fifth Congress and International Automation Exposition, New York.

30,000 Engine Cores a Day

moved by YALE TRUCKS

The Ford Motor Company produce about 2,500 vehicles a day at Dagenham – and they employ some 150 Yale trucks to help them do it. The illustration shows core racks loaded with baked engine cores being moved by a Yale Worksaver to the storage area. Approximately 30,000 cores a day are handled in this manner.

Another typical example of Worksaver reliability is exemplified in the foundry where 4 Yale Worksavers working 16 hours a day move some 200 tons of fettled engine blocks in and out of lifts from one floor to another.

YALE ADVISORY SERVICE The Yale Advisory Service will give you free advice on any aspect of materials handling. A free booklet giving information about Yale Trucks and Hoists will be sent on application.

THESE YALE FEATURES HELP TO CUT DOWN-TIME

Drive wheel mounting

1. Only Yale WORKSAVERS have taper bored wheels for easy removal. Wheels can be changed quickly without using a tyre press.
2. Wheel Hubs are slitted and tapered with splined bores to fit drive axle.
3. Movement of Wheel on Axle is non-existent–assures long spline shaft life.
4. Only Four Bolts are required to pull wheel hubs tight together against the tapered bore, thus clamping the wheel firmly to splined drive axle.

YALE REGISTERED TRADE MARK

The world's largest range of materials handling equipment

THE YALE & TOWNE MANUFACTURING COMPANY, MATERIALS HANDLING DIVISION, DEPT. ES.2 WEDNESFIELD, STAFFS.

LETTERS TO THE EDITOR

PUT CRAFTSMANSHIP INTO METALWORK

IF something is not done within the next decade, there is certain to be an extreme shortage of craftsmen able to undertake decorative architectural metalwork of the highest quality.

I would go so far as to say that the craftsmanship for which this country has been renowned would disappear.

The position extends throughout blacksmithery, foundry workers, and in all other departments of architectural metalworking where the hand-made product is valued.

I have tried over a number of years to remedy the position by writing books on the subject and serving on various trade committees.

I wonder if readers have any ideas and, if so, whether they would write to me.

The main thing, of course, is to bring home to young men the interest and satisfaction of working in such crafts, and also the practical advantages to be gained in them. Obviously, with shortages of available craftsmen, pay is likely to rise steeply. It seems to me that some form of concerted action by interested employers is the obvious way to recruit skill.

R. G. Lister.

George Lister & Sons Ltd.,
Abbey Road,
Cambridge.

Control unions to boost output!

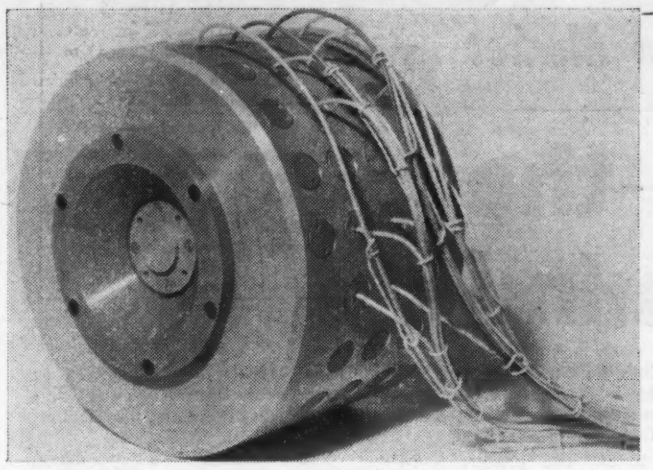
BRITISH INDUSTRY is not in need of greater central government control, nor of any simile of France's planned economy system.

The primal way in which the government can help is to legislate control of the militant power of the union elements responsible for disrupting flow production, and of bringing it to a standstill by devious ways and means.

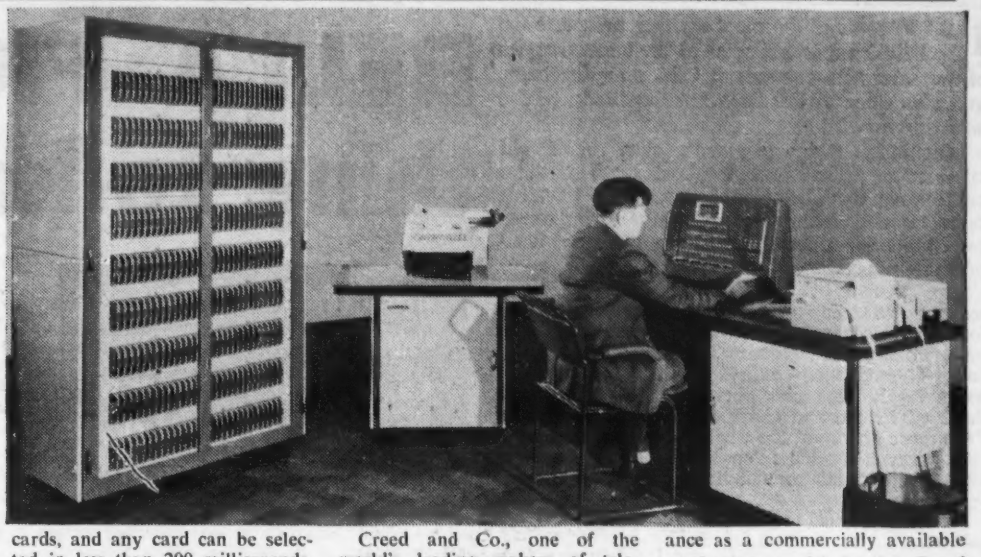
There is nothing fundamentally at fault with the economy of British industry if left alone unfettered by restrictive practices, and impositions which obstruct and delay expansion in the race for higher production at lower costs and prices to meet foreign competition.

FRANCIS B. WILLMOTT
River Street,
Birmingham, 5.

THE ELECTRONIC COMPUTER EXHIBITION



Miniature magnetic storage drum on show for the first time made by Sperry Gyroscope. — Up to 12,000 r.p.m.



English Electric KDN2 — low-cost system capable of a wide variety of tasks.

Producers increase speed and simplify operations

RAPID growth in the application of computers for industry provided much of interest for engineers at the Electronic computer Exhibition at Olympia, which closes today. Speeds have reached even greater proportions, and attention has been devoted to ease of operation and better facilities for changing programming instructions at each computation stage.

EMI's first operational Emidec Data Processing System comprises a computing centre and a wide range of peripheral equipment, including input, output, and magnetic tape memory units.

This machine employs a simple but effective order code and the facilities provided by the computer and its input/output units simplify this major programming task.

Impressive

An impressive increase in output of information from this computer is provided by the Anelex High Speed Printer which prints 1,000 or more lines per minute of full alphanumeric characters or over 2,000 lines per minute numeric.

A new Argus electronic digital computer and control system shown by Ferranti is to be operational at the end of the year for automatic control of industrial plant.

The computer is based on circuits constructed entirely from solid-state components and uses binary serial/parallel fixed-point arithmetic.

Manual programme

Programming the machine is done manually by inserting pegs of magnetic material into holes in printed circuits arranged in trays.

Information can be read into the computer from several hundred instruments in a plant, subjected to any mathematical operations, and then used to generate output signals for direct control of the plant, or for operating logging devices.

Claimed to be the fastest output printer in the world, Rank Precision Industries Ltd. exhibited their "Xeronic" machine, which prints 4,700 characters per second. Simultaneously, it prints its own forms to contain the information from a selection of four different designs.

A Card Random Access Memory, called CRAM, developed by the National Cash Register Co. Ltd. and used with their new 315 computer, employs over 4,000 cards, each with seven strips of magnetic tape.

The total information content of each card is over 5¼ million alpha-numeric characters which is equivalent to over 69,000 punched cards, and any card can be selected in less than 200 milliseconds.

Also associated with this company is a new punched card reader which is the fastest yet. This reads and checks up to 2,000 cards per minute, each card containing 80 columns.

Creed and Co., one of the world's leading makers of teleprinters, exhibited for the first time a new self-contained electromechanical data processing system with a 60 m.p.h. punched tape memory.

Also making its first appearance as a commercially available production model is the Creed electromechanical output printer designed as an economical computer output printer. This is ten times faster than the fastest conventional teleprinter.

GIANT COMPUTERS FOR BRITISH UNIVERSITIES

By our own correspondent

PROFESSOR T. KILBURN, head of Manchester University's electronics engineering department, thinks that even a speed of a million calculations a second on electronic computers will be far exceeded in the future.

He was about to set off on a three-weeks lecture to Moscow with his colleague Dr. D. B. G. Edwards, senior lecturer in his department, where they will talk about the "Atlas" computer which has been under development for five years at Manchester University and at the Manchester works of Ferranti Ltd.

First "Atlas"

The first production "Atlas" is now being assembled at Ferranti Ltd. and will be available for operation next year. "We have reached the stage where we have got the body of it down and a lot of parts are coming direct from the Ferranti factory more or less complete," he told Engineering News in an interview.

The second machine is to go to Harwell for the National Institute for Research in Nuclear Science and will be operational in 1964.

London University is to get the third production model of "Atlas". It will cost over £2 million and British Petroleum will have a share in it.

"There are practically no limits to the speeds that can be attained on electronic computers," Prof. Kilburn said. "The present machine is about 5,000 times faster than the one developed in the late 1940s. By new designs there is a speed increase factor of two times every year, so you can imagine what can be attained in say ten years."

He did not agree with the criticism made by Lord Brabazon of Tara about the conservatism of British industry in putting computers to work.

Lord Brabazon said at the opening of the Computers Exhibition at Olympia that in electronics Britain had led the world. We were first with television, first with radar. But in the field of computers we had lagged behind America and the Continent in Europe, not in making computers, but in selling them. There are about 1,000 computers installed and working in Europe. In Britain there are about 350.

"Yet there are more manufacturers here than in the rest of the world put together."

Great future

Prof. Kilburn commented: "If our ratio compared with Europe is a third then we are not doing too badly. The whole problem is bound up with economics. Our firms want to know that when they obtain a computer they are going to be better off from a production point of view. They are cautious, that is all. There is a great future ahead for the electronic computer industry."

He pointed to the announcement that over the next ten years the Government is expected to spend between £15 million and £20 million on electronic computers.

Eighteen were already installed in Government departments and nine more were on order.

MADE TO MEASURE

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THE STEEL COMPANY OF WALES LIMITED

ITALY

Opportunities for Britain within the Common Market

THE Common Market challenge to Britain's engineering industries is the biggest single issue since the war.

Engineering News presents a weekly survey of Britain's prospects. This week's report, the second in the series, is from Italy. Next week the spotlight falls on West Germany, then Belgium and Luxembourg, and Holland.

BELLA FIGURA—the thing to keep in mind

ITALY: some of the most exciting prospects for British exporters, some of the best examples of the sales achievements of U.K. manufacturers, and also some of the liveliest competition in the home market.

Machinery and equipment, cars, household appliances, agricultural tractors, textiles—these are among the examples I have been given of opportunities already seized by our exporters or awaiting exploitation by producers one step ahead of the competition.

ENGINEERING NEWS sends its Industrial Editor-J. D. F. Perry to report from inside the COMMON MARKET . . .

The strength of the Italian economy reflected in mounting foreign exchange reserves springs from a fast growing industrial production allied to wage levels noticeably below those of France and Germany. Even more important the wholesale prices index fell from the 1953 level of 100 to 98.8 last year.

Industrial output rose in the years from 1951 to 1960 by an average of 8.5 per cent, almost equalling the West German 8.8 per cent. But from 1953 to 1960 the wholesale prices index for the West Germans had climbed from 100 to 106.9.

Italian businessmen discuss their development with engaging directness.

U.S. aid

"You must remember," I was told within an hour of arriving in Rome, "that United States aid poured into this country after the war. With this help we built industries with new, efficient equipment."

This phase is long past. The successful Italian industries, whether heavy or civil engineering or companies producing consumer goods and materials, have long since become independent of foreign aid.

They are now broadening their technical alliances. In the great new administration blocks of Milan there is constant attention to the chances of making useful technical and trading agreements with parallel firms in the European Economic Community and in Britain.

Approaches had been made to U.K. interests long before Britain applied to join the Common Market.

Behind such business moves lies recognition among Italian engineers of the standards reached in British engineering. This applies particularly to the British aviation industry and, I am told, to the work done on military equipment for ground forces since the setting up of NATO.

Certain British products and types of equipment were described to me with enthusiasm and our successes are worth examining in detail.

The lessons they contain are easily applicable by other manufacturers with determination and readiness to invest in an expanding market.

Success story

"Do not come as a flash in the pan," one banker said to me. "A company coming into Europe must be prepared to spend money to set up its sales organisation and its services. After that it has to say clearly and loudly what it can do."

The story of the Ford Anglia in Italy is one of success by a product that brought something new to a bitterly contested section of the market. With home-built Fiat models and their French and German equivalents, the small car market in Italy does not lack for contenders.

Selling from their Dagenham factory on the Thames, Ford's pushed their total car sales in Italy from 335 in 1959 up to eight times as many last year. The key that opened this particular door was the Anglia car.

Sales double

In the first seven months of this year Anglia sales rose to 4,000, doubling the rate in the same months of last year.

The something extra that the Italians see in the Anglia was explained to me by an industrialist who turned up for lunch in a limousine that seemed about twice the length of an Anglia.

"Such a motor car was at once popular in this country," he said, "The reason for this was that it had style. Setting the rear window to slope at that angle was clever."

And the Italian is prepared to buy something which has style and is clever.

The phrase that the Italians apply to this quality themselves is bella figura. Not meaning snob value and certainly not that every manufactured product should have a beautiful appearance, the phrase reflects the clear conviction that even if the product to be bought is cheap it shall not show it.

Thus if a tailor is providing a suit of more than usually economical material it will still be cut with style, if the typewriter is cheap and saves material at every possible point it will still be mechanically reliable and present a fashionable, well-finished appearance.

Finish and reliability are the qualities looked for in the labour-saving devices that rising incomes are bringing within the reach of the rank-and-file workers in all but the impoverished south.

And if the impoverished south, the Mezzogiordo, is not yet a market for manufactured consumer goods, the drive the Italian Government is putting into the establishment of industry in the region creates opportunities for equipping the new factories.

If any one product is to be singled out as making the name of British reliability in Italy since the war it is the agricultural tractor.

The decision to allow the special "Rotation Fund" to be used for imports provides a new boost to UK tractor sales in the South. After a series of conversations I am left wondering if the Britsh tractor is a new symbol for a long life of hard work.

There is no reason why the development of Italy's under-developed south should be left exclusively to Italian and foreign non-British companies.

Anglias queue for shipment from Ford's own dock at Dagenham.

The incentives offered by the authorities are comparable to those to be found anywhere else in Europe, to the north there is a prosperous home market and southern Italy is well placed to send exports to north Africa, to the Middle East and to the European states bordering the Mediterranean.

Any British firm considering setting up in the Common Market mainland and looking for further opportunities beyond Europe might look into the inducements set out to attract industry

Machine tools

While the south, or parts of it, move at one bound into modern industrial society, the established industries in the north are fully involved in the struggle to keep plant and machines competitive both in economy and speed of production.

This means that machine tools from whatever source, home or overseas, are assessed primarily against performance.

British delivery dates are now, I have been widely told, a little shorter than those from West Germany. In some cases the advantage on delivery is considerable but the important qualification is made that closer attention to designing exactly the machine for the range of functions the manufacturer requires is needed if this advantage is to be taken.

Right time

As the investigating mission from the Export Council for Europe found, this is the right time for a big drive to be made in this field.

From Italian and English business people I have heard the same complaints: that there is not enough appreciation of the willingness of Italian companies to enter into consortia for specific large-scale projects. The combined Anglo-Italian team of companies for the Kariba Dam was a good example of such co-operation.

When the 50 million strong British home market is added to the Common Market with its 172 million population, an event I certainly find some Italian manufacturers anticipating with enthusiasm, similar teamwork may be found nearer home

Summing up

Conclusions: Price advantage and sophisticated design have led to some brisk Italian contributions to the British market, domestic sewing machines and typewriters have been two examples, and on the same basis others are likely. Design flair, allied to the appeal of the Italian background and the growing number with a holiday acquaintance with the country, may lead to a variety of new incursions.

Despite the opportunities Britain's share of the Italian import bill, which rose by 40 per cent last year, improved by only three per cent. This year UK exports look like being a third better than last.

Given more vigorous representation, sustained sales programmes and the development of after-sales service, the bounding Italian economy can be a ready market for much larger British sales than the 34s. per head spent on UK imports in 1960.

Well-equipped with commercial officers in the north, the British Embassy in Rome (the Villa Walkonski, Via Conte Rosso, 25 Rome) is a good starting point for companies making a first approach.

For YOUR offices in the 60's

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High-pressure hose firm opens factory in Wales

EUROPE'S largest high-pressure hose factory was opened in South Wales this week. Super Oil Seals and Gaskets have converted a factory at Llanishen near Cardiff. It stands on 34 acres of land and floor space is 270,000 sq. ft.

Expansion by the company into South Wales began with a 15-man team in 1951. Prevented from further expansion in Birmingham the fast-growing Super Oil Seals took over a government-built factory which was at first thought to be too big for their needs.

Within eight years the labour force had increased to 800 and the original 60,000 sq. ft. factory enlarged to 85,000 sq. ft.

Originally dependent on the car industry for the state of its order book, the company has diversified through the development of its seals and flexible hose lines up to the point where its prosperity is related to the demand from a wide range of the engineering industries.

One type of seal goes into steel rolling mills; a special type goes to ship propeller shafts; there is also a modified seal for use with disc brakes on high-speed passenger coaches travelling on the M1 motorway.

The new factory is in a former Royal Ordnance factory, for which defence orders had dwindled.

Expansion problems

Some of the difficulties associated with industrial expansion in the region were listed by Lord Brecon, Minister of State for Welsh Affairs, at the formal opening ceremony.

Skilled labour availability, training facilities, housing and transport services, were described by Lord Brecon as causes for concern, but, he said, not grounds for alarm.

At its King's Norton, Birmingham, factory centre Super Oil Seals occupies 150,000 sq. ft. and its new factory at Redditch is of 90,000 sq. ft. Two thirds of the hose produced goes overseas.

BISRA MEETING STARTS

THE role hydrogen plays in the embrittlement of iron and steel needs to be fully understood. Its effects and methods of removal form the subject of papers being read at the Harrogate conference of B.I.S.R.A., which opened yesterday.

Broadly speaking, when the hydrogen content of steel is excessive, stresses normally relieved by deformation give rise to fractures.

The mere presence of this gas does not cause these failures but is related to a time factor.

After a certain critical stress has been applied the hydrogen has to move to a particular site before it creates damage. Thus, a high rate of strain will not permit time for movement, therefore no embrittlement shows.

Today's session will deal with the removal of hydrogen by gas purging, vacuum casting, and diffusion.

Included is an account of a pneumatic process which is ideal for treating small quantities of special steels where the cost of vacuum degassing is prohibitive.

It consists of directing jets of inert gas on to the surface of a bath of steel. This reduces the hydrogen to a level which ensures freedom from flaking.

KEEP CONTROL —*President*

GIVING his presidential address to the Chelmsford Engineering Society, on Thursday, Mr. A. E. Gregg, managing director of Crompton Parkinson (Chelmsford), Ltd., emphasised the importance of preventing the local manager from starting up manufacture of new products under local stimulus.

He advocated a system in which an authorised range of products is agreed by the main board of directors in London.

DSIR TEAM AIDS U.S. RESEARCH

Skid-resistance tests on wet runways

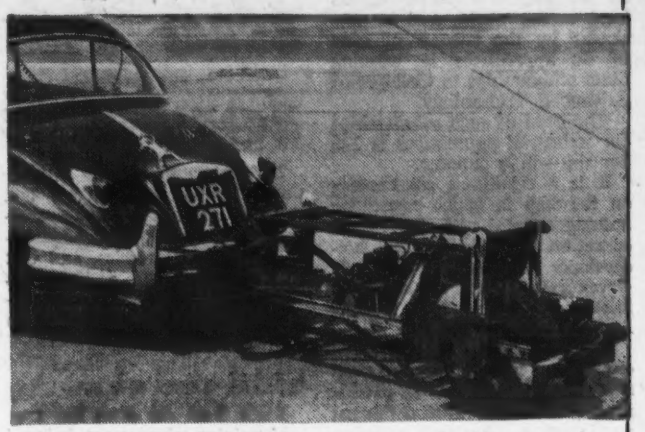
A BRITISH machine, the only one in existence capable of measuring skidding resistance on wet runways at speeds over 100 m.p.h., has been taken to the United States by a three-man team from the Department of Scientific and Industrial Research.

The party are making skidding resistance studies on an airfield at Atlantic City, New Jersey, at the request of the National Aeronautics and Space Administration and Federal Aviation Agency, U.S.A., who are financing the project.

Scientists and engineers of the D.S.I.R.'s Road Research Laboratory, West Drayton, Middlesex, have developed the machine, in the form of a small trailer, to study the problem of friction on wet runway surfaces in Britain.

Most of the runways in the U.K. have been measured with this equipment.

The trailer, which is towed by a Jaguar XK-150, is single-wheeled and fitted with a hydraulic disc type brake. The brake is servo-electrically operated by the driver from a push-button switch.



Braking force between tyre and wet surface is measured when the test wheel is locked for 1-2 seconds whilst at speed, taking a large-scale investigation of landing and take-off distances required by aircraft on wet or slush-covered runways.

The Americans are under-

AMERICAN LETTER

USAEC will study Canadian reactor

THE U.S. Atomic Energy Commission has selected Allis-Chalmers to conduct a specialised nuclear study of the reactor for the first full-scale nuclear power plant to be built in Canada.

Digital computer techniques will be used to determine power generating characteristics of the reactor core.

The study will be conducted under a co-operative agreement with Atomic Energy of Canada Ltd.

Called CANDU, the reactor will be heavy water moderated and cooled, a type pioneered by Canada.

It will be installed near Kincardine, Ontario, and site preparation is now under way.

* * *

A VEHICULAR mechanical arm system was unveiled by General Mills, Inc., at the Aerospace Panorama held recently in Philadelphia.

The device can pick up, move, deposit, reposition, raise or lower, insert, or remove work loads within its working range under the guidance of a human operator controlling the machine from a remote station.

Three major elements of The Little Ranger are (a) the mechanical arm; (b) a telescoping mast to which the arm is attached, and (c) the mobile steel chassis that carries them.

The chassis itself incorporates a system of multi-groove V-belt tracks and fixed drive sheaves.

Each track is individually powered by a ¾ h.p. motor. With independent drive on each track an operator can turn the machine within a 40-in. diameter circle. It has a minimum speed of 8ft./min. and a maximum speed of 100 ft./min.

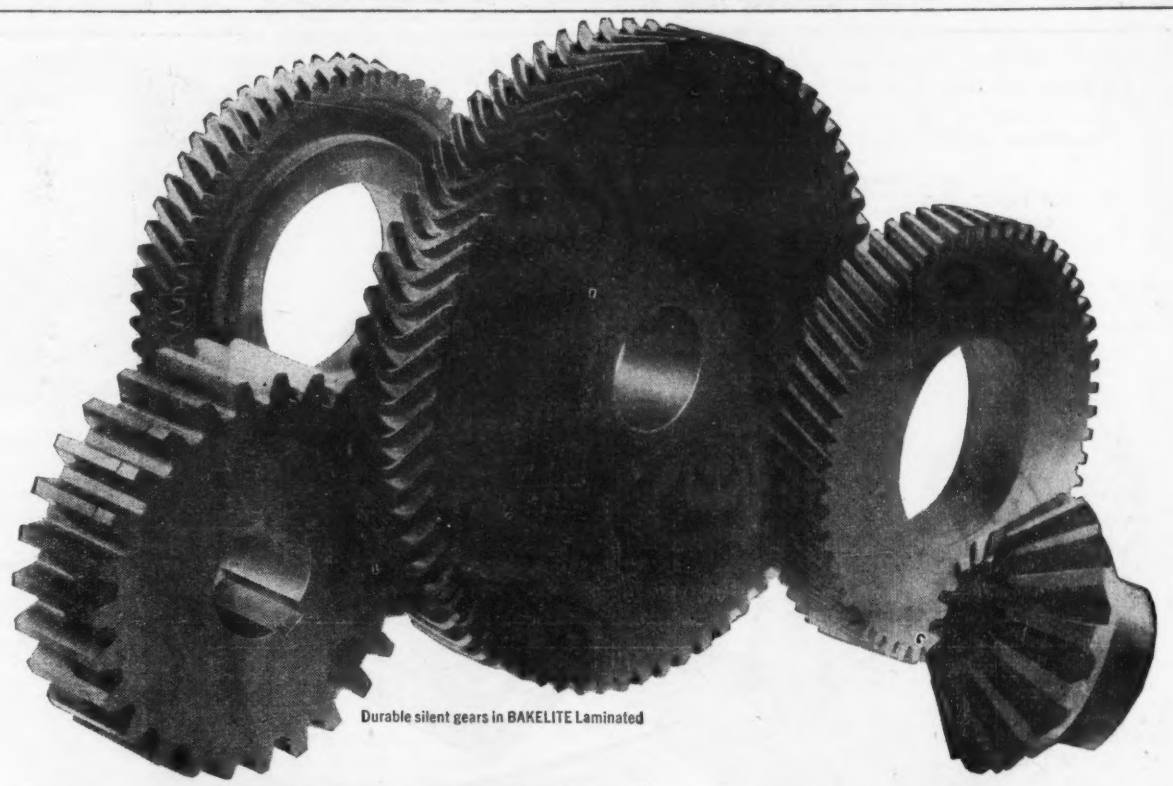
* * *

IMPROVED accuracy of bank record-keeping and increased speed in processing cheques to their final destination results from a new machine introduced by the National Cash Register Co.

The system uses a replaceable-type program board which can be changed in a few seconds. The board controls the use of distribution totals, magnetic ink imprinting, computation of "float", and endorsement of cheques.

The machine also offers up to 40 totals of automatic sort, processing time being saved by combining separate operations into one step.

A central operating console is supplied together with a sorter endorser unit, and an individual listing tape printer for each corresponding classification total and document storage compartment.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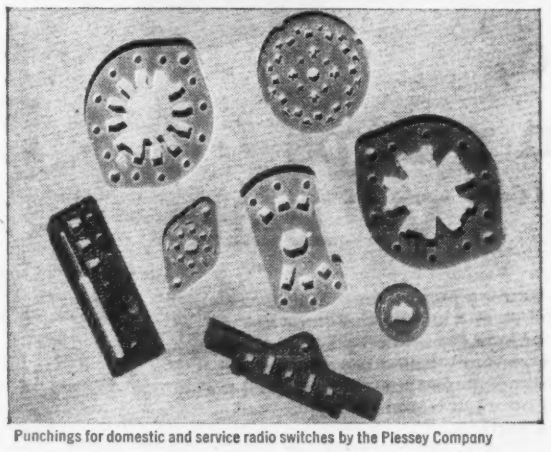
Punchings for domestic and service radio switches by the Plessey Company

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EDUCATION and TRAINING

Leyland take the long term view

FOR the Leyland commercial vehicle firm, the success of its training programmes is shown by the group's position as the largest exporter of its kind in the world, and in particular by the success of nine of its apprentices in winning State scholarships to Colleges of Advanced Technology.

The total of such scholarships for industrial apprentices is 225 for the whole country.

It is a significant commentary on the way in which apprentice training coupled with day release education can help the late-developer that three of Leyland's eleven state scholars are boys who failed to reach grammar schools in the 11-plus examination.

Getting into a successful engineering concern as an apprentice can be as difficult as obtaining a place for a boy at a famous public school. Leyland, dwarfing a small Lancashire village south of Preston, are no exception. With some 800 apprentices at varying stages of progress, at least four applications reach Mr. Harold Glassbrook, the Apprentices' Superintendent, for every place that he has to fill.

Like many others the Apprentices' Superintendent wishes that those he selects came to the company with a rather better acquaintance with mathematics, and that their spelling was a little less erratic, but Mr. Glassbrook believes that standards have begun to improve.

Skill the aim

Right from the start the Leyland training schemes are designed to produce skilled workers of broad experience, who will carry their basic understanding to whatever branch of the firm's activity they may reach. This is why applications from boys who want to become apprentice draughtsmen are turned down. Some at least of the outstanding success of the Leyland vehicles may be traced to the fact that the drawing office is exclusively staffed with men who have passed through at least three years of a craft apprentice course.

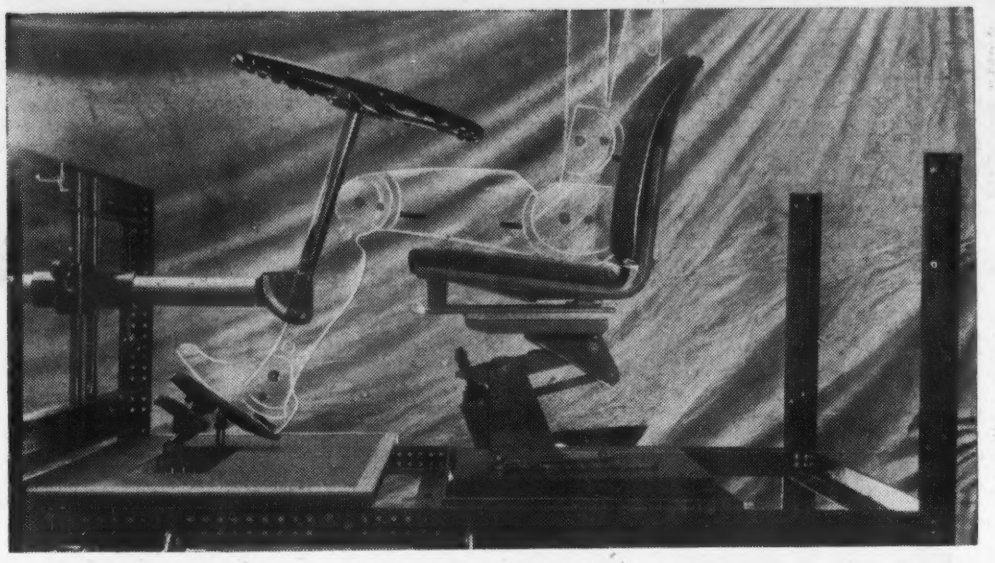
For at least the first three years of each boy's life at Leylands an important part of his work is the day spent at the company-built day continuation school. There is a notably cooperative attitude from the foremen and others in the works. This is partly because the school has been maintained since 1919, and many remember their own days there.

"Do they still teach you to do it like this?" is more often heard than, "You'll learn nowt up there."

Mr. Harold Bailey, the school principal, who is also an enthusiast for methods of quicker reading, has tactfully arranged that the more technical works should be the most accessible.

With each move from one section or machine to another the foreman will fill in a works report covering each apprentice's Quality of Work, Conduct, Timekeeping, Effort, Progress and Common Sense. Care with the wording of the Grades against which the foremen places his tick has seen to it that as far as possible no word is repeated. Thus the busy foreman adding his opinion to the accumulating evidence on Apprentice Jones can choose, under the Quality of Work column from Precise, Good, Passable or Careless. Under Common Sense he can put his mark against Used Throughout, Used Frequently, Used Sparingly or Sparingly.

The term average is deliberately avoided. Given the chance, many foremen will find the word average to apply to all the characteristics of a surprisingly high number of the boys passing through their sections.



Project on driver comfort gives apprentices a chance to contribute ideas.

Two schemes

Outside the mainstream of its 800 apprentices Leyland have two training schemes both reflecting the special need to provide men with the skills needed in an organisation making the running in the development of heavy-duty vehicles. They are the Advanced Automobile Engineering Course and the Commercial Apprenticeship Scheme.

Since it is the company's strict rule that all Engineering Division executives must be outstanding designers and engineers those succeeding in the Advanced Automobile Engineering course are getting their careers away to a flying start.

After looking at chassis subjects, from layout and the function of units to legal requirements, the course goes into the greatest detail over the power unit, types of combustion chamber, piston speeds and acceleration, torsional vibration and the effect of manifold shapes on general performance.

In addition to the incentive to do well on the course provided by the stimulus to a student's career, there is the obvious encouragement of a three-month travelling scholarship in the United States for the man who is first in the final examination. Scholarships tenable for a month each on the Continent go to the second and third in the final results.

The second of the company's additional courses is the Commercial Apprenticeship Scheme, designed to provide men trained in the commercial departments of a group whose needs are for staff in the parent Leyland Motors, in Standard-Triumph International, in Albion Motors, at Glasgow, and in Scammell Lorries.

With the recent changes in official arrangements covering further education related to commercial positions, the new scheme will enable the able boy to gather experience around the Commercial Division. Courses now lead directly to such professional qualifications as those for cost accountants and chartered secretaries.

Special

The Advanced Automobile Engineering course and the Commercial Apprenticeship scheme are specially designed, functional courses fashioned to meet the particular needs of the front-rank heavy-vehicle producer.

The state scholarship winners going on to Diploma of Technology courses, at CATs including Salford and Wolverhampton, indicate the standards which the day continuation and workshops training practised at the company can consistently reach.

A "Pullen" standard Centrifugal Pump with a Turners V-Belt drive from electric motor—model 'TB'. Photograph by courtesy Fredk. A. Pullen & Co Ltd.

THE MARK OF BETTER BELTING

Look Dad,
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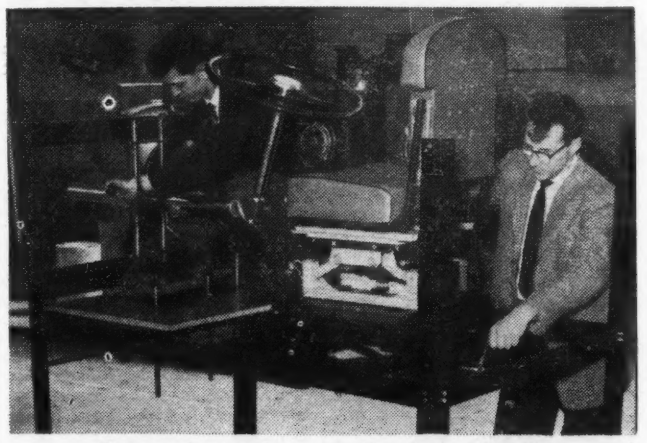


Fitting cab controls to suit the plastic "driver".

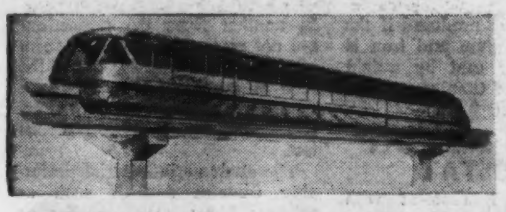
DUNLOP SENDS OUT 500,000 BOOKLETS

ONLY five years after starting their present series of projects booklets the Educational Section of the Dunlop company has now sent out more than half a million copies.

The company first produced simply written booklets in response to requests for information from school teachers.

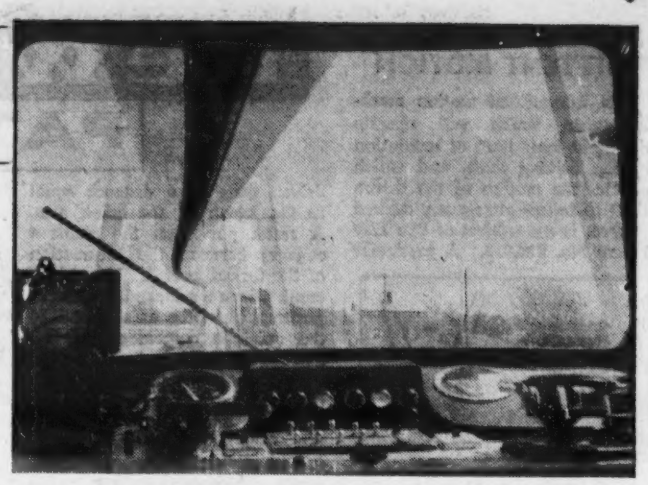
Now the range of Project series takes in "Making a car tyre", "Making footwear with rubber", and others describing company products and processes.

For schools with academic examinations in view and little time for excursions off the syllabus, the Educational Section prepared a photoset on the Dunlop Malayan rubber interests which was sent out to grammar and public schools.



Advance drawing of the Alweg coach to be used in Seattle's 1962 World Fair

A driver's-eye view in a city of the future



IT'S FASTER BY MONO

SPACE and air travel develop rapidly, but little down-to-earth improvement has been made to travel methods. The biggest brake on land transport advance is the replanning and demolition required. Monorail services seem to answer this problem.

A highlight of the 1962 Seattle World's Fair will be the first high-speed, monorail, passenger line—from Pine Street, the central business district, to the Exposition grounds. The journey of 1.2 miles will take 96 seconds. The Seattle installation is being built by the Swedish Alweg company which maintains an experimental line at Cologne, and which built a monorail in Disneyland, California.

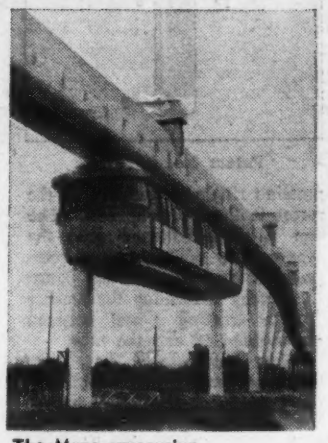
Alweg design

The Alweg design travels along a concrete beamway supported by pylons. This beamway in Seattle will be an "I" section, three feet wide and five feet deep. Steel plates will be attached to the upper horizontal and four vertical surfaces forming the tracks. Electrical power supplying conductors are set in the side cavity of the beam.

The cars will be supported by main driving wheels on the top surface, and steadied with side track wheels at two levels. The wheels, 39½in. diameter for load carrying and 25in. diameter for stabilising, will be pneumatic-tyred. In the event of puncture, rubber-tyred rollers will come into operation.

Each car body will be supported by two bogeys. An inverted "U" frame will join these to form the main chassis. Body formers will have side sheeting and fairing fastened by spot welding. Electric motors with safe armature speeds of 6,500 r.p.m., situated in the side pockets of the cars, will drive all axles by cardan shaft and gearbox transmission.

Speeds for the Cologne system are as high as 90 m.p.h. Seattle's monorail will run at 60 m.p.h. Braking system is mechanical between zero and 10 m.p.h., and dynamic from 10 m.p.h. upwards.



The Mono suspension system in Chateauneuf-sur-Loire

SEATTLE'S MONORAIL
An artist's impression

The "up" and "down" tracks will be mounted side by side 21 feet above roadways on single concrete columns which will be 85 feet apart on the straight and 60 feet apart on curves. The city terminus will span Pine Street with three platforms, two outside platforms for entry and a centre platform for exit. Passengers will reach the platforms on speed ramps. The Fair ground station will be at ground level.

In England

A NEW French prototype at Chateauneuf - sur - Loire, is attracting attention. A British consortium, including the Michelin and Renault companies are interested in building a monorail of this type at Scarborough.

Unlike the Alweg, the French design is suspended from a box girder with split lower flange. The girder houses running tracks and power supply. Supports for the girder, as with the Alweg system, can be sited to span existing road and rail facilities on single or double legs.

The box girder design protects the track surfaces and supply system against weather and reduces bogey running noises. The monorail cars are attractive in appearance, constructed on the monococque principle in light alloy. Cars seat 32 with 91 standing.

Cars are suspended on traction bogeys fitted with carrying and guiding wheels. The bogeys drop on to steel safety wheels of smaller diameter in the event of puncture.

Each bogey is powered by a 115 h.p. D.C. motor, mounted integrally with the bogey assembly. It transmits power through primary, gleason - type, conical gears and secondary, straight-tooth gearing. Gears are enclosed in steel casing and coupled to the differential. Two braking systems are employed; rheostat brakes acting on the traction motors, and pneumatic on wheel drums.

High costs

MONORAILS have been tried and do work. The Listowel and Ballybunnion railway, in service from 1888 until 1924, carried cars saddle-bag fashion over a 9½ mile line. Main driving and supporting wheels ran on an apex rail with auxiliary wheels engaging guide rails at either side, rails being mounted on triangular frames. The line eventually closed through maintenance costs and competition.

For over 50 years a monorail has operated in the Wuppertal valley, Germany. Still in service, it carries thousands of passengers daily over an eight-mile line through a dense industrial district.

Interest in the monorail is growing rapidly, but proof of its operation value is still awaited. The monorail scores highest in congested cities and towns; installations can run over existing streets, negotiating corners of 100 feet radius. Cost is about one-sixth of an underground railway of the same capacity.

For long distance lines in open country possibly no advantage would be gained against the conventional railway. The monorail's best opportunity lies in the cities and towns, and it is here, if anywhere, that the monorail will thrive.

'Roadrailers' for trial on Eastern Region

FIFTY "Roadrailers", vehicles capable of running equally well on roads or rails, will be delivered to British Railways within the next six weeks.

Costing about £200,000 they are being built at the Linwood, near Paisley, factory of the Pressed Steel Co. They will be put on service for extensive trials on the East Coast railway route between London and Edinburgh

The "Roadrailer" is equipped with both steel-flanged and rubber-tyred wheels. Using a compressed air mechanism it can be switched from one to the other in 2½ minutes.

Apart from a source of compressed air the only other facility needed is a concreted section of railway yard with sunken rails, to permit the vehicle to run off or on.

Loaded at the dispatch point, the dual vehicle is hauled by road to the nearest goods yard or railhead.

CEGB installs synchronous condenser for super grid

THE largest synchronous condenser to be installed in Britain is now in place at the Iver, Bucks, substation of the Central Electricity's Generating Board's southern division.

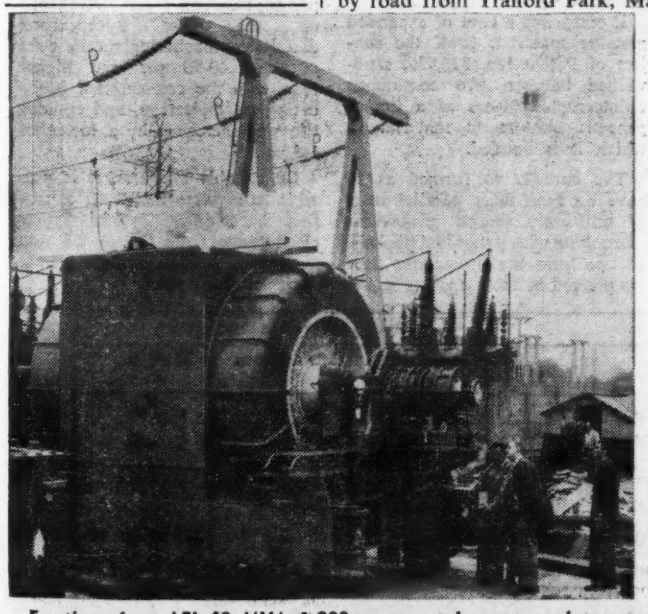
Weighing 110 tons, the 40 MVA 1,000 r.p.m. condenser, produced by Associated Electrical Industries, was moved in one piece by road from Trafford Park, Manchester, and put in position on site without a crane being used.

Allowance was made in the design for outdoor installation. Only a small mobile crane is needed for maintenance purposes.

The synchronous condenser, the first of two, is to be used by CEGB for power factor correction and voltage regulation on the 275kV super grid.

Two similar machines are to be supplied by AEI for the Elstree, Herts, substation of the North Thames division of the South East Region of the CEGB.

The company has manufactured other machines for overseas systems where high voltage transmission lines are in use, including Australia, Africa, India, New Zealand and Spain.



Erection of an AEI 40 MVA 1,000 r.p.m. synchronous condenser at Iver, Bucks, substation of the CEGB.

STATION CHANGE

Halifax Corporation Development Committee have approved the conversion of a railway goods station at Pellon to a light industrial and commercial site.

Positive hydraulic drives providing smooth stepless speed variation over 27/1 range with sensitive accurate control at all output speeds. Carter Gears are made in eleven sizes for variable speed drives from fractional up to forty horsepower. Speed control setting adjustments may be made with the drive either running or stationary by remote electrical, lever or handwheel controls (all available as standard) and many forms of pneumatic, etc., control systems may also be used.

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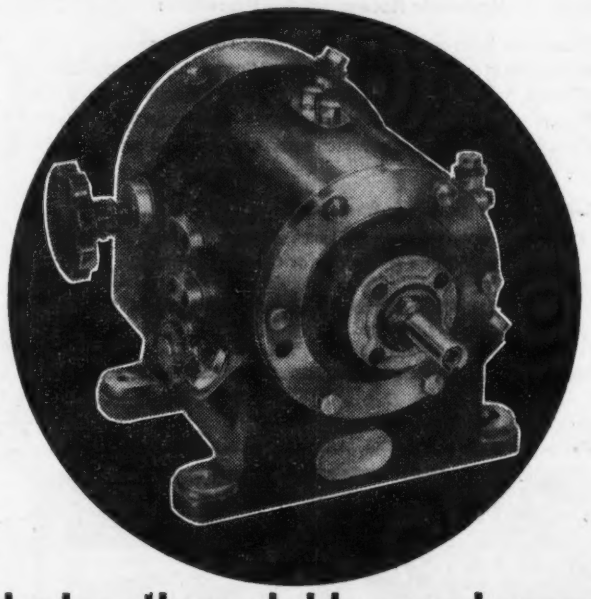

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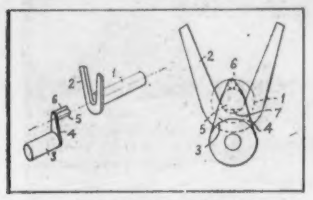
new PATENTS

SYSTEM FOR INTERMITTENT MOTION

AN intermittent motion mechanism which will operate during at least 180° of revolution of the driving shaft, and which enables the motion of the driven shaft to follow almost any desired pattern, is the subject of **Pye L'sv Patent No. 876,913.** A particular



Patent No. 876,913

application of the invention concerns a TV-camera, turret-operating mechanism.

Basically the intermittent motion mechanism comprises a forked lever 2 mounted on a driving shaft 1. The driven shaft 3, carrying a crank 4, is offset from the driven shaft by a distance equal to the length of the crank arm. A crank pin 5 on the crank 4 engages between the bifurcation of the forked lever 2. The driven crank 4 is in the locked or indexed position when the axial centre of the crankpin coincides with the axis of the driving shaft.

A further pin 6, smaller than the crankpin 5, is attached to the crankarm adjacent to the crankpin. As the driving shaft rotates it will at first produce no movement of the driven shaft 3; but as soon as the fork 2 contacts the pin 6, the driven shaft is pushed out of the locked position and will be driven.

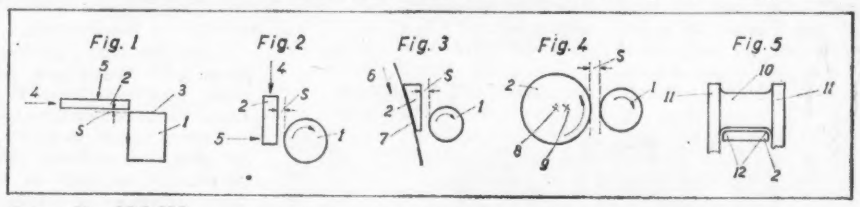
One revolution of the driving shaft 1 brings the whole mechanism back to the locked position and it can be seen that the output from shaft 3 may be either a complete revolution per single indexing or it may be a motion through a predetermined angle.

SPARK-EROSION ELECTRODE FEEDS

IN conventional techniques for spark machining of workpieces, there is an inherent disadvantage that any equalities in the surface of the work are reproduced on the surface of the working electrode.

The invention outlined in **Patent No. 876,692, Deutsche Edelstahlwerke Aktiengesellschaft, Germany,** aims to overcome this drawback, by continuously advancing unused parts of the electrode to the spark-eroding region and at the same time imparting a feed movement to maintain the requisite spark gap.

Referring to the illustrations:



Patent No. 876,692

Fig. 1 illustrates surface 3 of a flat workpiece 1 being spark-eroded by electrode 2. The electrode is conducted along a path which is the resultant of a component traversing motion in the direction of arrow 4, continuously bringing fresh sections of the electrode into co-operation with the surface of the workpiece, and an in-feeding motion in the direction of arrow 5.

Fig. 2 shows the method applied to a rotating cylindrical workpiece; here a wedge-shaped electrode moves along an inclined plane towards the workpiece surface.

In Fig. 4 the workpiece is processed by a rotating disc-shaped electrode; the opposite motion is achieved by rotating the electrode, to provide the traversing movement, about an eccentric axis 9 displaced towards the centre axis of the revolving work.

A particular application to which the invention has been directed is the finishing of crankshaft journals by applying the method shown in Fig. 3, using an electrode 2 of width corresponding with the length of the journal and appropriately radiused 12 (Fig. 5).

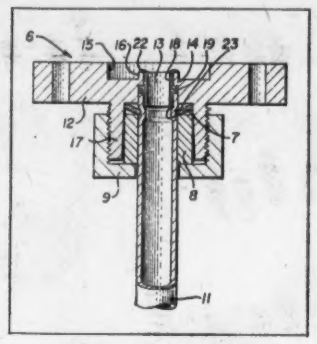
PRESSURE-SEALED TUBE COUPLINGS

A TUBE coupling assembly for use in high vacuum or pressure systems is the subject of **Patent No. 876,610, taken out by Varian Associates, California, U.S.A.**

The invention provides for coupling a tube 11 to a body member 6; the latter can be bolted to a similar tube coupling assembly, or to some other component of a vacuum or pressure system. The body member has an annular recess surrounding the exhaust port 13, the diameters of this recess being chosen to receive the end of the tube 11.

A conical washer 7 fits slidably within the threaded nipple 17 which extends from the inner side of the body member flange. The inside diameter of the washer is chosen to receive tube 11. A compression ring 8 has the same outside and inside diameter as washer 7, and the combined length of washer and compression ring is slightly greater than the depth of bore in nipple 17. The cap element 9, drilled through its end to receive tube 11, is threaded for screw-mounting on nipple 17.

In assembling, washer 7 is first inserted, followed by the compression ring and the cap element is then screwed on. The tube 11 is inserted through the cap, com-



Patent No. 876,610

pression ring and washer into the recess in the body member. The cap is then tightened onto the nipple, thus advancing the compression ring towards the flange 12 thereby deforming the washer 7, thus creating a seal between the bushing 18 and the tube.

When the washer has been deformed and compressed onto the tube, these two members are fixed together, and since the washer is held against the body member flange by the compression ring the tube cannot be removed from the coupling assembly until the cap is unscrewed from the nipple.

HIGH-RESISTANCE GOLD ALLOYS

NEW alloys for high-resistance potentiometer windings of reduced size and weight, of particular interest for aircraft applications, are covered by **Patent No. 876,887, filed by Deutsche Gold- und Silber-Scheideanstalt vormalts Roessler, Germany.**

Such materials are required to have constant high electrical resistance after long operating periods, very low temperature coefficient, good wear resistance, good formability, and very high corrosion resistance. They must also offer a constant low contact resistance.

Hitherto, it has only been possible to obtain the required standards of corrosion resistance, low contact resistance and low temperature coefficient by the use of alloys with a high content of noble metal which, however, offered only a low specific resistance.

The new family of gold alloys covered by this patent have overcome this disadvantage. Typical composition and properties of some of the alloys are given in the table below.

Up to 30 per cent of gold can be replaced by silver, with cost savings. For light alloys of particularly high specific resistance up to 65 per cent of the gold is replaced by palladium; such alloys can still be worked satisfactorily. They have, moreover, the most unusual characteristic of showing their best possible resistance in the soft annealed condition. For this reason even after overheating their resistance is constant.

Preferred alloys comprise 85-40 per cent gold, 10-55 per cent palladium, 1-5 per cent titanium, 3-8 per cent iron.

Best results are produced if the sum of the titanium and iron is less than 7 per cent by weight and the ration of titanium to iron is from 0.25:1 to 0.5:1.

PRINTED ELEMENT RHEOSTAT

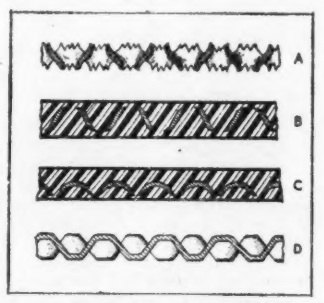
A COMPACT rheostat with good heat dissipation characteristics is described in **Patent No. 876,978, taken out by Joseph Lucas (Industries) Ltd.** The resistance element comprises an aluminium backing plate faced with epoxy resin on which is printed or deposited a thin layer of electrically conductive material. This lainated sheet, formed in the flat, is subsequently bent to part-cylindrical form and attached to the internal periphery of a cylindrical rheostat housing.

One end of the resistance element is conducted to an external terminal. Within the housing is a rotary wiper having a contact shoe to make contact with the resistance layer. The contact shoe is electrically connected in any convenient manner with the other terminal.

The Patent outlines a particular example of the application of the rheostat in the form of a combined switch and rheostat for controlling a windscreen-wiper motor.

METAL - REINFORCED GASKET MATERIAL

A METAL - REINFORCED gasket material capable of withstanding high pressures and temperatures, impervious to petrol, oils and coolants, and capable of maintaining a seal between cylinder heads and blocks even when



Patent No. 876,937

(A) Cross-section taken diagonally through core. (B) Similar cross-section with elastomeric material applied. (C) Section through the centre of a row of projections. (D) Section taken diagonally through core.

the sealing surfaces have defects such as tool marks, sandholes and so on, is described in **Patent No. 876,937, registered by Victor Manufacturing and Gasket Co., Chicago, U.S.A.**

It comprises a core of expanded metallic material, itself the subject of Patent No. 876,936, sandwiched between two continuous uninterrupted layers of a homogeneous elastomeric material to which it is bonded.

The core is so formed as to have on both faces parallel rows of uniformly spaced projections alternating with pyramidal pockets. In one form the projections may be pierced at their apex (Fig. A). In another form the projections are not pierced and take the form of rising knuckles rising out of the face of the sheet (Fig. D). Both types have shown themselves effective sealing agents under rigorous test.

The elastomeric material preferably contains a filter such as asbestos fibres, metal powder or barytes, etc., and a binder such as polychloroprene, butadiene-styrene, butadiene - acrylonitrile (Buna N), p.t.f.e., polyacrylics, trifluoroethylene, siloxames, or epoxy resins together with vulcanising agents, stabilisers and plasticisers.

Hitherto, membranes using Buna N as binder have been considered unsuitable for internal - combustion engine gaskets as, although noted for heat and abrasion resistance and for resistance to swelling in gasoline and oil, such membranes have lacked strength and soon blown out.

The reinforcing core of the present invention provides the necessary strength and thereby makes available the advantage of Buna N for cylinder-head gaskets.

SOLID LUBRICANT FOR METALS

A SOLID lubricant, carbon monofluoride, claimed to have a tenacious adhesion to metal surfaces, is covered by **Patent No. 877,122 of Institut Dr. Ing. Reinhard, Straumann A.G., Switzerland.** The Patent also covers processes for applying it to a working surface subjected to frictional strain.

One method of applying the dry lubricant is by simply dusting or rubbing it on to the working surface. Another possibility is to apply a suspension of carbon monofluoride in an inert liquid to the working surface; a lubricant film will then remain when the liquid evaporates.

In a process for applying the solid lubricant to compacted components of sintered metals, the solid lubricant can be incorporated during actual production.

Carbon monofluoride is equally satisfactory as a dry lubricant applied to synthetic resin components and precious or semi-precious stones. It has proved particularly suitable for such items as clock and watch springs, escapements, arbors, pivot pins and bearings.

SPARK MACHINING DIELECTRICS

SUBSTANTIAL increases in the electrical output of spark erosion machines are claimed for specific dielectric liquids, the preparation and use of which is the subject of **Patent No. 877,597 of Compagnie Francais de Raffinage, France.** The liquids are substantially aromatic hydrocarbons with a carbon : hydrogen ratio higher than 7:1, obtainable by solvent extraction of a petroleum distillate.

One example cited is the spark-machining of a block of hard 1 per cent carbon steel. Using one of the new hydrocarbon dielectrics, machining speeds were obtained 40-50 per cent higher than with the conventional lubricating oil dielectrics, and cathode life was increased by a factor of 1.5.

By suitable mixtures, it is possible to regulate the depth of surface hardening. Typical figures cited range from 0.3 to 2.8 mm of surface hardened layer on a block of hard steel.

% by weight				Specific resistance in ohms mm²/m		
Au	Pd	Fe	Ti	in the hard state	TK* from 0 to 100° C.	in the soft state
93.61	—	4.97	1.42	1.16	—	1.21
91.60	—	6.92	1.48	1.21	—	1.27
88.80	6.41	3.35	1.44	0.99	—	1.05
81.38	13.55	3.55	1.52	1.13	+ 0.4 10^{-4}	12.4
73.06	21.56	3.76	1.61	1.16	—	1.45
63.66	30.61	4.01	1.72	1.19	+ 0.2 10^{-4}	1.62

* TK = temperature coefficient of resistance

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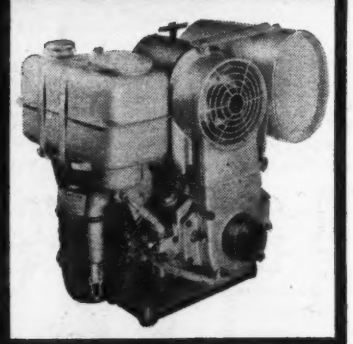

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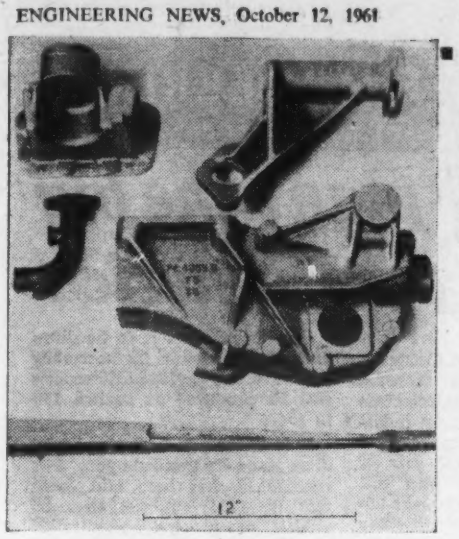
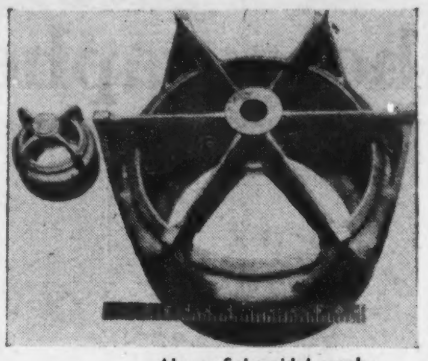


Left, castings of spheroidal graphite iron showing fine walls, and intricate design. Idea of size is given by the 12in. mark at the foot of the picture.

Cast iron — second only to steel



Above: Spheroidal graphite iron cast into governor valve bodies. Note the thin spokes.

Right: S.G. Iron heavy duty gear case, front spring bracket, sprocket wheel and brake shoes, cast in pairs.

The author emphasises a policy of continuous development in the ironfoundry industry.

CAST iron is a widely accepted engineering material, but the extent of its use is often not fully appreciated. With the exception of steel, it is by far the most widely used constructional metal.

The annual production of steel in the UK is somewhat more than 20 million tons per annum and the production of iron castings for 1960 was just under four million tons. No other metal approaches this tonnage.

The primary importance is that components can be cast to final shape, so that designs can be used which are impractical under any other process and which require a minimum of subsequent machining.

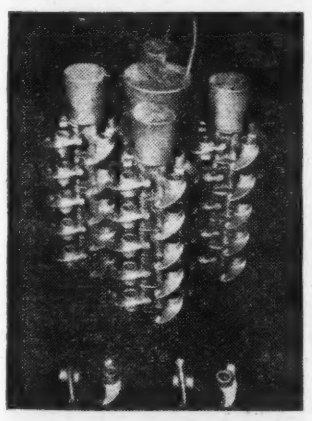
In the grey iron field machinability is of the utmost importance as it is on this property that the engineer depends to obtain a given profile with a minimum cost.

The relatively low cost of the material itself is often the deciding factor governing its use.

Telling figures

The reliance placed on this material is best indicated in a breakdown for the various industries. The automobile industry uses over 600,000 tons per annum; heavy engineering and shipbuilding over 200,000; the building industry over 400,000; and over 500,000 is used for pressure pipes and fittings. The balance of the tonnage is spread over a wide range of engineering uses.

Cast iron is available in many grades. By far the greatest tonnage is produced as grey iron ranging in tensile strength from 10 to 26 tons sq. in., and it is important to recognise the reasons which govern its application. The general requirements are: castability, machinability, and cost.



Rocker arms for car engines. Cast from spheroidal graphite iron to replace steel forgings.

British Standard Specification 1452:1956 quotes seven grades of cast iron based on the minimum tensile strength of a 1.2-in. diameter test bar.

These grades require the test bars to have tensile strengths not less than 10, 12, 14, 17, 20, 23 and 26 tons/sq. in. Variations in composition are necessary to suit the grade to be produced.

Most commercially produced iron falls within grades 10 and 17, all of which will produce castings which are freely machinable in sections down to ¼-in in thickness, and grades 10 and 12 can produce iron which is freely machinable to below ¼-in.

While the range of tensile strengths available makes it particularly suitable for stressed components, its excellent resistance to lubricated sliding wear encourages its use for internal combustion engine cylinders ranging from 3 to 30-in. in diameter.

by
H. T. ANGUS
Ph.D., M.Sc.
Deputy Director, The British Cast Iron Research Association.

A similar combination of properties makes it particularly suitable for piston rings. It forms the basis of most machine tools where its ability to be cast into complex shapes is combined with bearing requirements of slideways.

Grey cast iron also has considerable, instrinsic, corrosion resistance and this combined with the ability to mass produce pipes up to 48-in. diameter by the centrifugal casting process has led to its widespread use for piping water and gas.

Heat treatment or the addition of alloys to cast iron can significantly modify strength, corrosion resistance, abrasion resistance, and ductility.

Shock-proof

Other variations are available which will produce intensely hard castings capable of resisting dry abrasion. Considerable ductility and resistance to shock are found in malleable cast iron, both blackheart and whiteheart, and also in the more recently developed nodular or spheroidal graphite cast irons which are regularly produced with tensile strengths from 24 to 47 tons/sq. in., and with elongations from 2 to 17 per cent.

It is important to bear in mind that the grade of cast iron is related to the tensile strength in a given size of test bar but the strength in an actual casting will vary with the section thickness.

In specifying any particular grade of cast iron, a designer should bear in mind that while all grades in suitable sections can be readily machined, machinability reduces as tensile strength rises.

There are three grades of malleable cast iron which are specified by British Standards: whiteheart malleable iron (B.S.309:1958), blackheart malleable iron (B.S.310: 1958) and pearlitic malleable iron (B.S.3333:1961).

Whiteheart and blackheart malleable cast irons which may have elongations exceeding 14 per cent, are suitable for casting up to about 3 in. thick and are freely machinable. They offer a considerable degree of ductility and shock resistance down to −40°.

Whiteheart and blackheart castings are widely used in the automobile industry and also in the conveyor industry. They are also widely used for such pipe fittings as tees, elbows and valves.

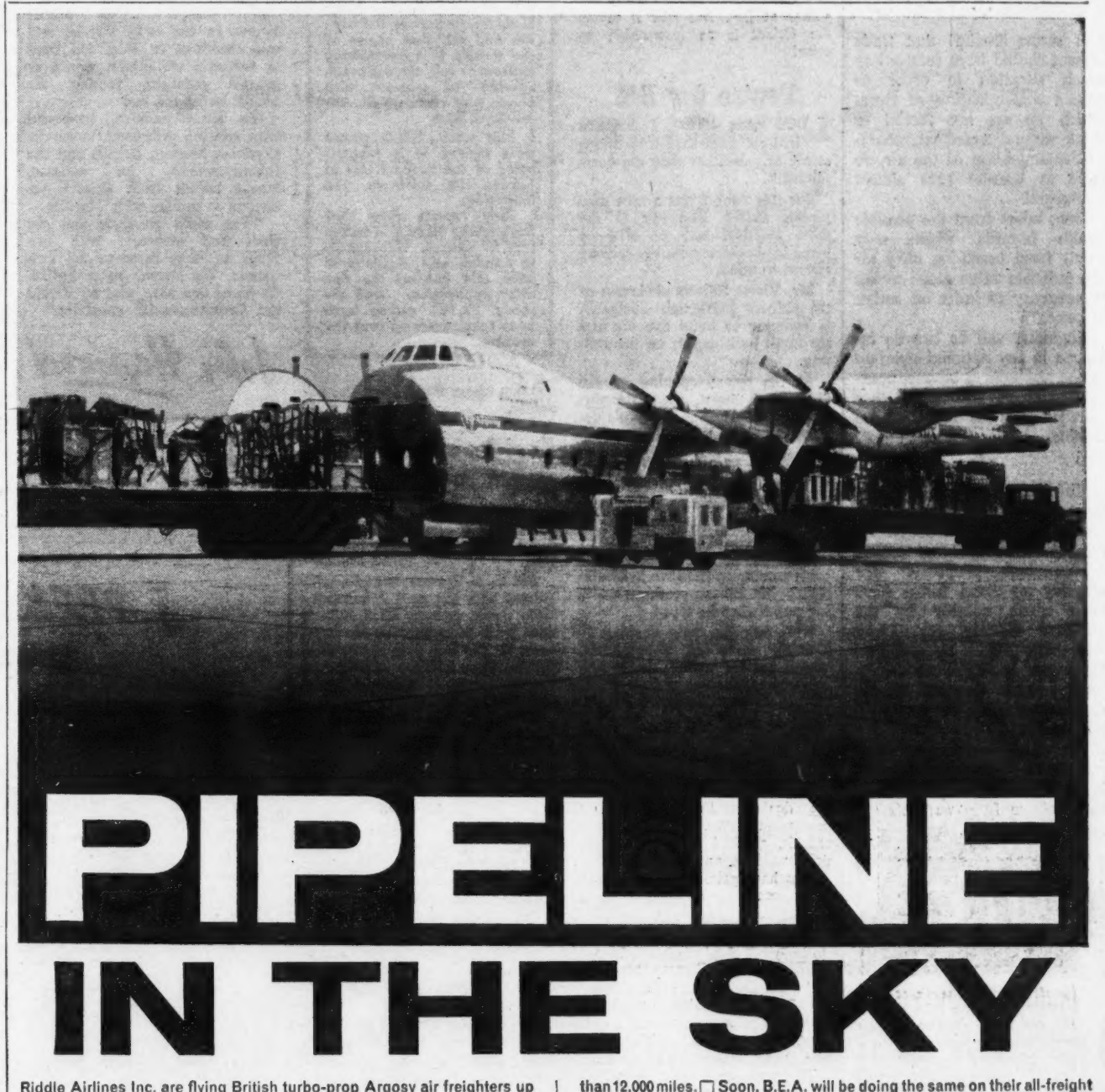
The pearlitic malleable cast irons are of particular interest offering up to 45 tons/sq. in., tensile stress, 35 tons/sq. in., 0.5 per cent permanent set stress associated with elongations of 2 per cent.

Nodular iron

Nodular or spheroidal graphite cast iron has been developed and can now be produced in castings of almost any section thickness.

It offers a wide range of tensile strengths, yield strength and elongation. Types can be produced which are ductile under impact conditions at temperatures down to −40°. Nodular cast iron with high yield strength and high fatigue strength, has been widely used for automobile crankshafts and its use is extending rapidly.

The ironfounding industry is well aware of the expanding requirements of modern times, and supports research on a large scale through the British Cast Iron Research Association at Alvechurch, Birmingham. The services and advice of this organisation are always available.



PIPELINE IN THE SKY

Riddle Airlines Inc. are flying British turbo-prop Argosy air freighters up to 13 hours daily on the U.S.A.F. Logair routes. Logair is one of the world's largest scheduled cargo operations—an aerial pipeline for the quick supply of urgent military equipment. ☐ From coast to coast these new Armstrong Whitworth aircraft, with their special Rolamat quick loading systems, speed outsize military cargoes in their capacious holds, over a network of routes covering the U.S.A. Daily schedules bridge more than 12,000 miles. ☐ Soon, B.E.A. will be doing the same on their all-freight routes. Argosies will open up new high-speed supply lines for outsize cargoes between the U.K. and Europe. ☐ The Argosy is the only aircraft in the world with truck bed height double-end loading. Using the Rolamat cargo handling system, up to 13½ tons of bulky freight can be loaded swiftly through the full-width doors at each end of the 47 ft. long, 6 ft. 8 ins. high, 10 ft. wide fuselage.

This fast turbo-prop freighter offers:
To the manufacturer—large dimensions, minimum packaging, less insurance, negligible damage, high speed transit, less dismantling and reduced dispatch charges.
To the customer—quicker and cheaper delivery, reduced stocks and inventories, more positive supply schedules.
Transportation economics for machinery or other special equipment can now be considered at the early planning stage.

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ENGINEERING NEWS

Published by Heywood and Co. Ltd., Drury House, Russell Street, London, W.C.12. Phone: Temple Bar 3422. Grams: Organigram phone. London.

Thursday, October 12, 1961

Breath of change

RIGID enforcement of legislation to prevent contamination of the atmosphere by smoke and also, we hope, obnoxious fumes must surely come.

The appalling thing is that progress in this direction has been slow. As Mr. G. W. Herrick, Chief Public Health Inspector, Fulham, pointed out at the Clean Air Conference in Brighton on Friday, local authorities have already demonstrated that smoke control areas can be brought about within the existing law.

★

It seems illogical that trade effluent should have received so much attention in order to reduce contamination of rivers which we are not forced to drink without treatment, whereas contamination of the air we have to breathe goes almost unchecked.

Even apart from the possible health hazards which may result from breathing dirty air the nuisance value alone makes it necessary to insist on action at once.

Engineers will be heavily involved in any national clean-up of the atmosphere because combustion in one form or another is responsible for much of the trouble.

★

Unfortunately one of the most irritating offenders is the diesel engine, particularly on road vehicles in large towns.

Numerous proposals for cleaning up diesel fumes have been made notably by the National Society for Clean Air. They include research into filters and catalytic absorbers, legislation to prevent engine overloading and improved maintenance.

All these need time and money but we agree with N.S.C.A. that the seriousness of the problem fully warrants the study and expense.

Tomorrow's technology

THERE is more than a possibility that the efficiency of automobile engines may be increased by a substantial figure—possibly doubled.

M. H. Edson, of the Esso Research and Engineering Co., has evolved a mathematical model of an ideal engine and he has studied, with the help of a computer, the performance which might be expected from such an engine.

To improve the efficiency, the compression ratio would have to be increased

Esso research at present is being limited to a compression ratio of 300 to 1 but there seems to be no theoretical reason why the compression ratio should not go even higher.

An Engineer's DIARY

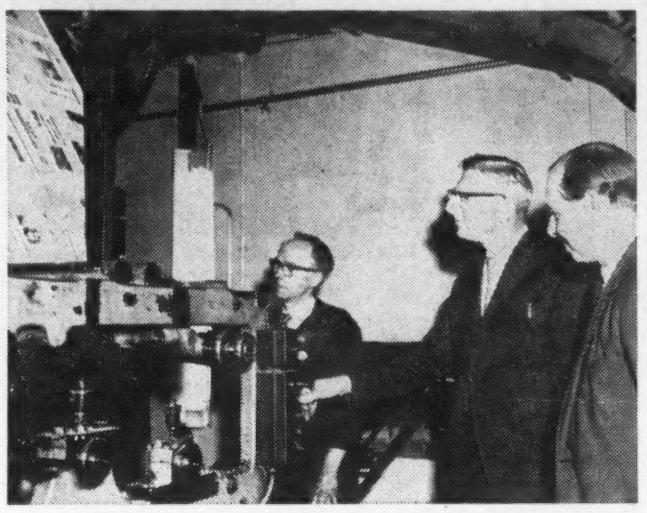
China's delegate bans the photographers

A BRIEF story recently came over the wire, headed "Peking Delegation, including Mr. T. H. Wu, director of Civil Aviation for the Republic of China, visits diesel engine factory."

Photographers prepared to move in, only to find that the bamboo curtain is still very much in place—the delegation had asked that no photographs should be available to the Press.

This seemed most odd, for Mr. Wu's visit to this country is by no means secret—he was to be seen at the Farnborough Air Show last month—and as a highly placed member of the Chinese Administration he is a welcome guest.

With improved trade between China and Britain, with the embargoes lifted off many items, it looked as though Eastern and Western minds might come together at last. But still it seems the Orient is as inscrutable as ever!



NATIONAL Trade Press editorial director Mr. L. E. Morris presses the button and the first copies of the world's first engineering newspaper roll off the press. Sharing the moment with him is advertisement director Mr. S. C. Burt.

This week 1,200 guests were invited to a cocktail party at the Savoy Hotel in London to celebrate the launching.

Early reports show that Engineering News is a necessary newspaper. Newsagents in London and Birmingham were sold out on the day after publication. And already 12,763 orders have been taken from all over the country.

Praise for BR

LIKE many others, I find the bad points of British Railways easier to remember than the compliments.

But this week I met a man who praises British Railways in the most practical way of all—he plans his business with the railway system in mind.

Mr. Victor Ellison, chairman of the Cement Marketing Company, is planning to build five big and six small bulk depots on the railway.

At the recent opening of the Uddingston depot, near Glasgow, Mr. Ellison explained: "This demonstrates our faith in the railways and their much maligned, but extremely able, staff. It is our contribution to taking off our overloaded road system the heavy long-distance traffic that can go by rail."

Since the cement makers go to great trouble to improve their efficiency, Mr. Ellison produces a telling point when he says:

"We are the only country in Europe, including Scandinavia, whose cement makers have sent a greater percentage of their traffic by rail in the last five years instead of less."

This, he says, is a case of a wicked Transport Commission taking the cargo out of the holds of coastal shipping. Charges at the docks and restrictions on movements have, as Mr. Ellison sees it, reached the pitch where dock workers and shipping companies have priced themselves out of the cement carrying market.

Banker's hint

WHEN Lord Cromer moved in as Governor of the Bank of England, brains questioned what the new man would do, if anything, to the habit-formed policies and principles of the City.

The question is still open, but during the Lord Mayor's traditional dinner to bankers and merchants at the Mansion House last week Lord Cromer left a theoretical question unanswered that could carry a hint of changes.

"Are the money rates we have seen in this country in recent years the most appropriate to achieving the rate of progress we would like to see?"

There are a host of small, expanding companies in British industries who would answer that easier money terms, less stiff credit rates could aid their growth and speed their contribution to the industrial advance of the country whose Bank Lord Cromer guides.

Inside information

FOR those who back personal knowledge of industry with a little judicious investment there can never by enough of that precious commodity, inside information.

Mr. E. R. Norton, a senior consultant with Personal Administration, would scarcely class himself with those who dispense the latest news on the best bets in the City, but he does analyse between 30 and 40 businesses each year for investment purposes.

Last week he was talking on Pension Fund Investment at a two-day conference of the Industrial Welfare Society at the Cafe Royal.

Mr. Norton gave these rules on investing in a company:

- Look for a history of controlled growth.
- Look for financial soundness and to see whether the firm is adequately profitable.
- Find out how good the management is and the future possibilities.
- The economics of the company's product distribution, selling activity, and price policy should also be watched.

'Common' sense?

A CANADIAN who starts out as a timekeeper in Detroit, becomes chairman of a famous British firm and then goes off and works up the top executive grades to become chairman of another, must be worth listening to.

The Canadian in this case is Mr. H. F. Hodgson, who has just retired as chairman and managing director of Joseph Sankey and Sons, the Bilston, Staffs., and Wellington, Salop, engineers. Mr. Hodgson, who is retiring at 65, keeps his director's seat at Sankeys and on the parent, Guest, Keen and Nettlefold, board.

He joined Briggs Motor Bodies in the early thirties and was chairman in 1936. He went to Sankey's Wellington works as general manager, joining the board during the war

His main concern, expressed with striking directness, is on the Common Market. Britain and the Commonwealth, he believes, would benefit from Britain becoming a partner with The Six.

"The main point is that we shall find ourselves with five times as many home-market customers. We should be enthusiastic about the idea, and so should the Commonwealth countries."

John Heywood

SOVIET ENGINEERING
by our own correspondent

20-year plan: the big bid to pass America

ON October 17 the 22nd Congress of the Soviet Communist Party will be held in Moscow. At this meeting the achievements and shortcomings of Soviet industrial development as it has emerged at the end of this third year of the current seven-year plan will be assessed and the long-range 20-year plan, which will allegedly enable the Soviet Union to overhaul the USA in *per capita* production, will be laid.

Soviet newspapers and journals are at present including many accounts of achievements in overfilled production on the part of workers in factories or members of design offices, or of a particular industry as a whole.

Thus the editorial in the current number of "Stanki i Instrument" reports that over the years 1956-1961 inclusive, the gross production of metal-cutting machines increased by 1.8 times, whilst cutting tools, stamping-pressing machines, and foundry equipment increased by 1.9, 4.0 and 2.5, respectively.

Specifically in 1960 154,000 metal-cutting machines were produced, 29,500 stamping-pressing machines and 6,000 items of foundry machinery.

If the overall plan is to succeed much must depend upon the development of the heavy engineering industry. This again imposes demands for better and heavier machine tools. The position here is that in 1956-1960 21,250 heavy metal-cutting machines were produced.

★

Future plans, however, are even more ambitious. By 1966 the output of metal-cutting machines must amount to 270,000 and not less than 1,200 models must be put into production.

Special attention is to be given to the production of high-accuracy machines, and by 1965, 350 models will be produced as against 119 in 1960.

It is difficult to understand how these plans are decided upon. For example, it has been laid down that by 1965 not less than 80 models of programme-controlled machines must be mastered; will all these be required or is it just based on a rough guess that by that time the Americans will have mastered 79?

★

By way of contrast the situation in the foundry industry is not so satisfactory. In July 1959, Mr. Khrushchev pointed out at the July Plenum meeting of the Communist Party Central Committee, that foundry plant in the Soviet Union was backward in terms of level of mechanisation; the situation remains unsatisfactory.

The editorial of the journal "Liteinoye Proizvodstvo" complains that the specialisation of foundry plant is being unsatisfactorily developed, that the replacement of small unprofitable foundry plants by centralised integratedly-mechanised and automated plants is not proceeding rapidly enough.

Specifically "the plan for increasing the specialised power capacity for the two years of the seven-year plan has only been 50 per cent fulfilled in regard to pig-iron casting and 70 per cent for steel."

Of the 23 specialised foundry plants which ought to have been built in order to conform with the decisions of the 20th Congress, construction has begun on only two factories with a total capacity of 170,000 tons per year.

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Vacuum induction melting plant produces special alloys and steels

EUROPE'S LARGEST R.F. FURNACES

Continuous processing made possible by pressure-lock system

A VACUUM induction melting plant, claimed to be the largest of its kind in Europe, is now in full production at Jessop-Saville Ltd., a B.S.A. group company. A new 1-ton capacity furnace and two others of 600lb. are making special alloys and steels for the aircraft industry and Atomic Energy Authority.

The new furnace melts continuously. Airlocks enable moulds to be extracted and crucible charges to be inserted without loss of vacuum.

Moulds are wheeled into an airlock where the pressure is reduced in five minutes. An inner door can then be opened automatically and the mould moved into place in the main tank.

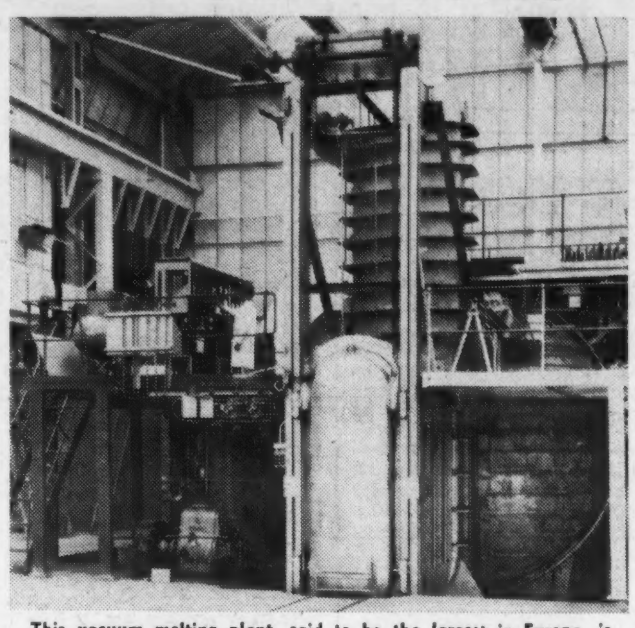
The crucible of molten metal, suspended from above, is then emptied into the mould.

While the mould is being removed the crucible is re-charged.

Pressure in the main tank during a melt is below 0.01 millimetres, (atmos. press. 760 m.m.).

Melting is by induction with radio frequency agitating the atoms of metal. Operating temperature is normally 1,650°C.

The furnace can be charged in two ways; small charges can be passed through a pressure lock on an arm, and large charges are fed by instalments through the top.



This vacuum melting plant, said to be the largest in Europe, is heated by radio frequency. It can melt continuously and air locks enable moulds to be extracted without breaking the vacuum.

PRE-FAB DECKS FOR SHIPS

A NEW development in shipbuilding was announced on Friday when Mr. John Maclay, Secretary of State for Scotland, formally opened the new premises of Rowan and Boden Ltd., at Paisley.

This firm of ship furnishers and weather-deck specialists have developed a process whereby they can prefabricate the difficult and expensive part of their Airadeck surfacing for the weather decks of ships.

This will make it possible to send the surfacing in plank form to almost any part of the world for local fitment.

Being a plastic composition, Airadeck is considerably lighter than the timber weather decking it replaces. If the composition has to be removed for any reason, replacing the surface is very much simpler than with timber.

The managing director of the firm, Mr. R. S. McNeill, regards the new process as the biggest advance in their technical history.

It is expected that a good European market will be developed first, followed by marketing over a broader field.

Speaking after the opening, Mr. Maclay said, "We hear criticism from time to time of the alleged failure of Scottish industrialists to move with the times. The history of Rowan and Boden provides a first-class answer to this kind of charge, since for over 40 years they have been expanding into various fields."

U.S. firm develops eutectic alloy

A TRULY homogeneous gold-tin eutectic is being produced by Accurate Specialities Inc., of New Jersey, USA.

This Au80—Sn20 compound, known as Acculoy 280C will combine with many metals and alloys. It withstands thermal cycling damage and has good corrosion and etch resistance, together with high electrical conductivity.

The new alloy is expected to make a strong impact in the semi-conductor industry.

SMALL CUTTER BEVELS HEAT EXCHANGER END CAPS

STEEL heat exchanger end caps—15ft. across and 2¼in. thick — have been successfully bevel cut with a British Oxygen portable pipe-cutting and bevelling machine, normally used for the oxygen cutting of pipes up to about 3-ft diameter.

The exchangers are being constructed at the Trawsfynydd Nuclear Power Station, North Wales.

After the end caps are cut off, equipment is placed inside and the ends are welded on again.

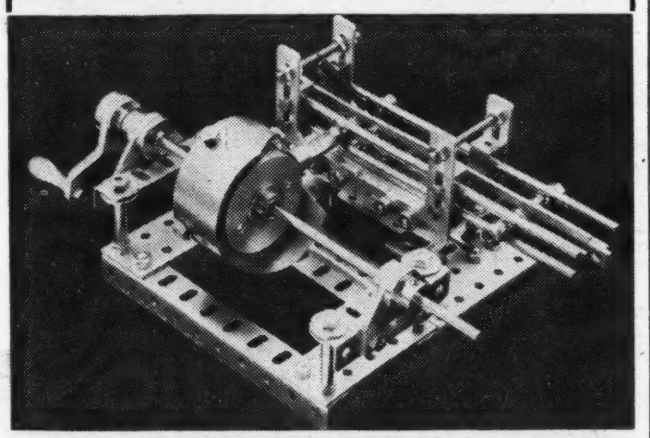
Cut in 70 minutes

A specialist from British Oxygen supervised the setting up of the pipe-cutting machine on a 53-ft long circular chain rig. The blowpipe was set to give a 15° bevel finish ready for automatic electric welding. One cut was made in 70 minutes.

The heat exchangers are being constructed by International Combustion Ltd., Derby.

Atomic Power Constructions Ltd. are building the station.

MODEL UNITS AID MECHANISM STUDY



Bell cam instructional model produced with Automat constructional kit components.

EXPLANATIONS of devices such as the Maltese Cross mechanism, the Oldham coupling or a planetary gear train become much more comprehensible when they are accompanied by a demonstration with a three-dimensional model. It is to construct models of these and other mechanisms that the Swiss-made Automat Engineering Sets have been developed.

A number of sets are available to cover such differing requirements as those of the young student working at home to those of the engineering department of a university.

Even the No. 1 set, consisting of 316 parts, allows models to be built to illustrate simple and compound gear trains, the calculation of module and outside diameters and centre distances, and a simple lathe complete with gear quadrant and lead screw.

Set No. 1500 contains some 4,000 components including, for example, 31 gear wheels, 3 racks, sprockets, chains, worms and worm wheels, belt pulleys, 15 couplings and clutches, ball bearings, 3 lead screws.

It is intended to meet more advanced requirements in the field of education and for use in the development departments of engineering firms.

A number of kits are also to be produced for the construction of particular mechanisms such as the bell cam, crank and rocker mechanisms, and a complete automatic screw machine.

Automat sets are to be marketed in the United Kingdom by International Engineering Concessionaires Ltd.

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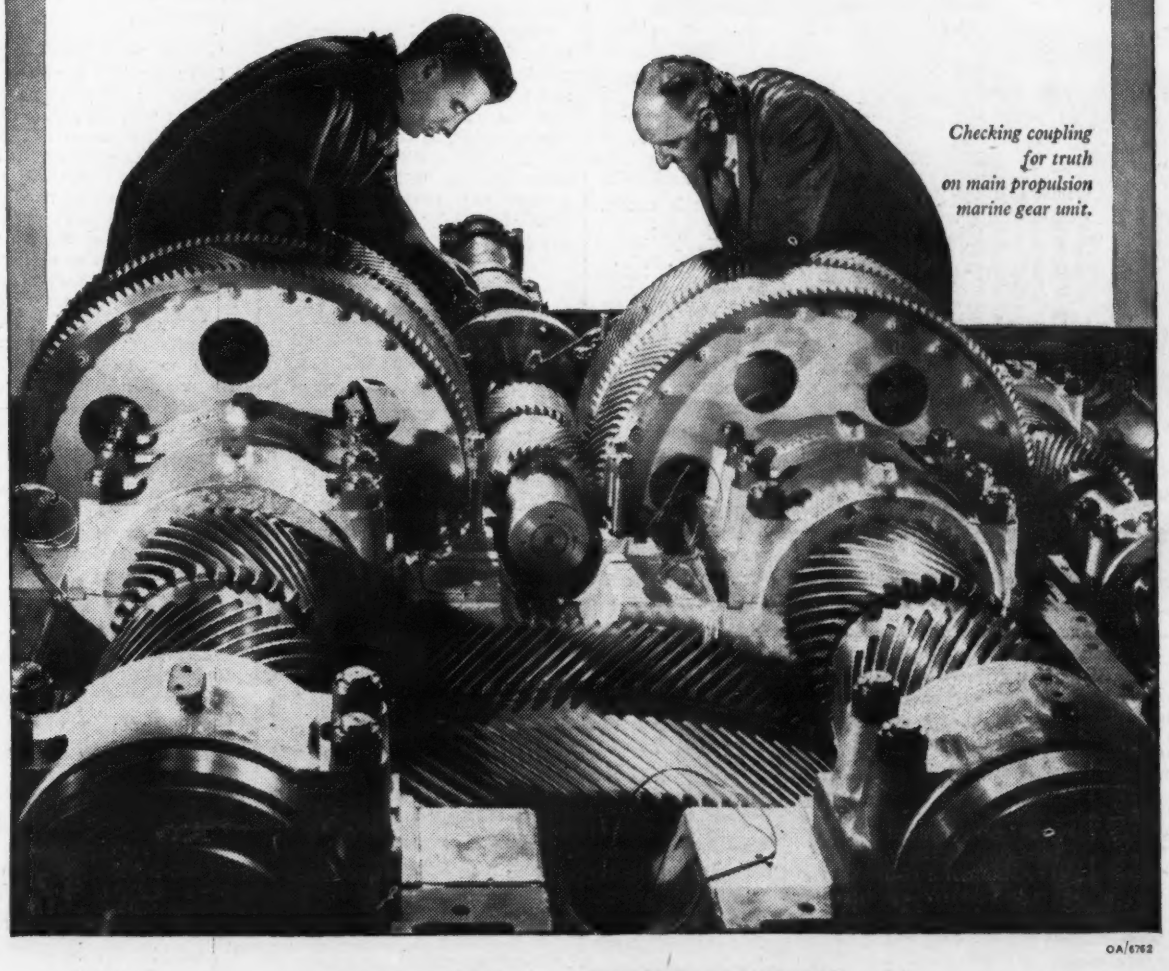

Checking coupling for truth on main propulsion marine gear unit.

OA/6762

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.....FOREIGN NEWS.....FROM OUR OWN CORRESPONDENTS....

Government to boost science education

JAPAN PLANS 10-YEAR DRIVE

Policy is aimed at doubling national income

TOKYO

A 10-YEAR-PLAN for developing scientific technology and engineering techniques has been drafted by Japan's Cabinet's Science, Engineering, and Technology Council, an advisory body to Prime Minister Hayato Ikeda. The scheme calls for balancing of technical development largely aimed at doubling the national income within 10 years.

Five sub-committees have, in fact, been studying since earlier this summer, as on "the target," "talent," "industrial and engineering research," "scientific systems and methods," and "information."

Conclusions will be reported to the Council and then passed upwards to higher levels of the government.

In Japan, the main hurdles to be overcome relate to finance. Many of the parts of the overall plan have been up for discussion in the past but funds were always lacking.

According to the present highly ambitious plan, however, Japanese agriculture before fiscal 1970 should be developed principally through a combination of technically skilled labour, stabilised farm management, and soil engineering techniques' employment.

In mining, civil, and electronic engineering emphasis on new skills and machinery is deemed essential. More development of overseas mining resources by Japanese assistance and through joint technical and capital tie-ups is urged.

Shipbuilding engineering techniques are also coming up for close scrutiny.

New corporation

Quite possibly a new technical development corporation will be launched with the aim of spurring all possible Japanese technological research. This agency, requiring an estimated $27,750,000 to establish, may be started on a government subsidy.

Hand in hand will go a programme forecasting a drastic increase in the nation's total force of engineers, research technicians, and scientists. Here, the Ministry of Education has decided to take steps to increase the number of instructors in engineering and technology at university level by 3,900 in the next 9-10 years.

It will set up a special course at the nine state universities to increase the number of engineering and technological high school teachers by 8,640 persons in the next eight years ahead.

During this 1961-62 Japanese fiscal year, the Ministry of Education plans, in addition, to enrol a total of some 1,800 persons in new technical courses.

Machine indexed by rotary-field magnet

BERLIN

ROTATING-FIELD magnet systems to move cutting heads or workpieces through a number of predetermined positions have been developed by Siemens-Schuckertwerke, of Western Germany.

When electrical drives are used to obtain indexing motions it has hitherto been necessary to employ relatively complicated mechanical transmission systems and electrical switching devices.

Rotating-field magnets work on the same principle as three-phase asynchronous motors but deliver their greatest torque when stationary and, in contrast to the normal motor which is designed for an optimum rated load, the rotating-field magnet is designed to give a certain stationary torque.

Clamping Devices

As the magnet works against a fixed stop and can deliver a predetermined torque continuously when switched on in the stationary position, it is also suitable for operating chucks and clamping devices of all types.

CAR DEALS IN SPAIN

MADRID

ACCORDING to the Spanish "Motor-Press" agency, Volkswagen have made "important contacts" with a Madrid company, with a view to the possibility of assembling Volkswagen cars in Spain.

With the participation of Colombian capital, the Barreiros group are planning to build a plant for producing tractors, engines and electrical equipment in Colombia; a similar project in the Argentine is also being studied.

The Colombian Barreiros company would import components from Spain, against exports of coffee.

U.S. prints are made to fade

LOS ANGELES

DRAWING prints that "fade away" are being tested at the Lockheed Missiles and Space Co., California, and their use may lead to a saving of one million dollars a year.

A process of controlled deterioration causes the tracings to disappear, leaving a blank piece of paper. The time for this can be predetermined.

In a fast-moving defence industry obsolescence is a serious factor. Disappearing ink obviates the engineer working from an outdate drawing.

The system is controlled by IBM type tabulating cards. Each card bears a drawing number and, in a small window, holds a microfilmed blueprint 35-mm square.

A card file no bigger than a cooker holds 10,000 microfilms. A clerk can produce a card in about three seconds.

Projected on a large screen, the technician can study the drawing at leisure; or he can push a button and receive a print.

If the print is made of disappearing ink, he knows it is good for a given number of weeks. After that he will have to get another one, perhaps a replacement of the print that has become obsolete.

Ultra-thin tubing development

WASHINGTON

THROUGH a new process developed in their Collegeville laboratories, Uniform Tubes Inc., Pennsylvania, U.S.A., announce that it can now offer seamless metal tubing with ultra-thin walls of 0.0127 mm.

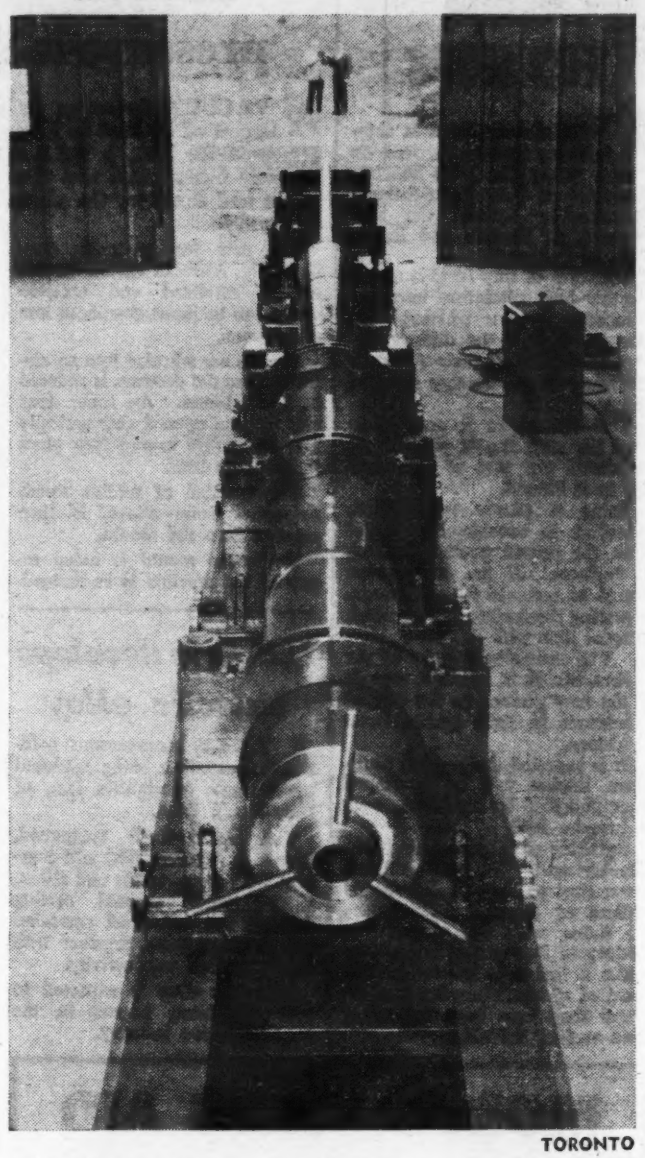
Culminating intensive research and development, this process redraws seamless metal tubing to this ultra-thin wall thickness with tolerances as close as ±2 microns and better.

At the moment, these new dimensions in fine seamless tubing are offered in five different grades of stainless steels, copper, copper alloys including beryllium copper, nickel, nickel alloys including Nichrome V and Tophet A, and glass-to-metal sealing alloys.

This tubing is pre-cut at the mill to any specified length up to 15 cm, and ends are concentric and free from burrs.

To the inherent properties of tubing is added the advantage of very light weight—150 metres of 0.254 mm outside diameter tubing of stainless steel with the 0.0127 mm wall, weighs less than one pound.

SPACE PROBES TO BE FIRED FROM GAS GUN



TORONTO

Double-chamber light gas gun in process of installation at CDC's Aerophysics Research Laboratory.

THE first privately owned research laboratory in North America to be engaged in the study of space technology is being set up by Computing Devices of Canada Ltd. at Stittsville, Ontario.

The Aerophysics Laboratory is to undertake basic research in the fields of: hyper-velocity impact and impact radiation; stability and control characteristics of advanced re-entry winged vehicles at speeds between Mach 10 and 20; plasma radiation and communications; and high-G telemetry.

Recent studies have shown that by proper selection of aerodynamic shape, instrumented vehicles can be fired vertically from smooth-bore propellant or light gas guns and achieve altitudes between 200,000 and 500,000 feet.

High speed

Such a vehicle can transmit data on atmospheric conditions or can perform a number of desired tests.

A 6in. gun with muzzle velocities of the order of 8,000 ft/sec, altitudes of over 400,000 ft can be attained with a payload of 40 to 50lb.

CDC scientists anticipate that firing rates of 8 to 10 shots per day are possible with this equipment.

The Laboratory's initial launching equipment consists of a number of 4in. smooth-bore guns which with solid propellent charges will permit tests of various projectiles and vehicles at speeds up to 8,000 ft/sec and a light gas gun with interchangeable barrels of varying bore between ½ and 2in. diameter capable of launch speeds up to 30,000 ft/sec.

Marine jet power unit

NEW YORK

A high-speed marine jet propulsion unit has been produced by the Oceanics Div. of Aerojet General, U.S.A.

Called Hydrocket, the unit scoops water through an intake duct at the bottom and discharges it rearward in the air through a number of angled nozzles located on the periphery of a rotating impeller.

Riding almost entirely above the waterline, the discharge takes the form of a rooster tail; it eliminates the effects of normal propeller cavitation, the major cause of efficiency loss at high speeds.

CAE ENTERS MACHINE TOOL CONTROL

PARIS

BECAUSE of the increasing interest which Industry is showing in electronically controlled machine-tools, the French Compagnie Europeene d'Automatisme Electronique (CAE), have decided to add a series of machine-tool control systems to their range of computers and data-processing machines.

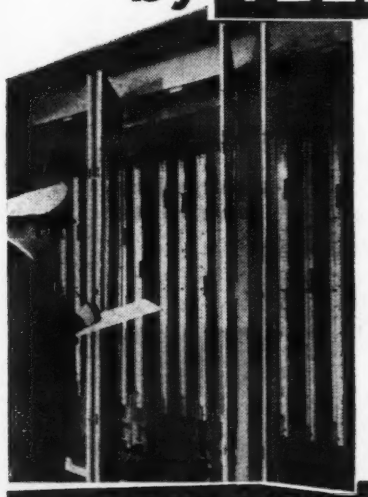
CAE has so far specialised in digital process-control systems for large industrial uses.

An agreement has also been reached between CAE and Thompson Ramo Wooldridge, their American parent company, concerning the sale and production in Europe of systems developed by the American company's electromagnetic group at Michigan City, (Indiana).

The new range of control systems is to be known under DCS (Director Control System).

Various models developed by Thompson Ramo Wooldridge for equipping a large range of machine tools are already in use.

Cargo tank control by TELEDEP



Accurate and continuous indication for centralised control.

Loading and discharging made easier, faster and safer.

Operation with tanks closed.

Used by the Federal Steam Navigation Co. Ltd. aboard their 48,000 ton Tankers "Derby" and "Kent."

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The aim should be a smoother flow of work...

...line production leads to greater economies

Efficient planning is vital to the small machine shop or the big jobbing factory

EFFICIENT planning is vital in undertakings of all types and sizes. It is important to the small machine shop which does a little sheet metal work, to the jobbing factory which employs several hundred workers, and to the larger concern with several thousand employees.

Each want a layout which will facilitate efficient production; each want to organise a smooth flow of work, and each want to produce economically. But the methods to be used are different. The owner of the small shop devotes only a part of his own time to these problems and he uses little or no "paper-work."

The jobbing factory with two hundred or more workers finds it profitable to use much much more advanced methods of planning and control.

But it is in the larger concerns that the problems of work planning are most acute and so it is there that some of the most interesting planning techniques are found.

SOUND DECISIONS

Unless policy decisions on major matters are sound it is impossible to achieve full success. When these major decisions have been taken, a co-ordinated effort can be made in the fields of product design, production methods, administration and selling, with a view to achieving the objectives set by the policy decisions.

The policy of the company will have decided the level of output for which the planning staff must provide. The planning staff consider the design of the product and the desired level of output and then decide on the production methods.

These in turn lead to an assessment of the plant required, operation by operation. Layout and production methods are considered right from the point where initial plans are being made for new designs which are then carefully "groomed" to permit economical manufacture.

Where possible, factory buildings are designed specifically for their job and arranged so as to take floor conveyors and overhead conveyors.

To equip a mass production assembly plant involves heavy capital investment in tools and equipment, and it requires a relatively long run of production to recover that expenditure.

Good layout reduces handling costs and simplifies many aspects of the control of production and so brings important economies in the cost of factory clerical routines; it also paves the way for the smooth and steady flow of a high volume of production which is essential if overhead costs per article are to be kept down.

Again, it facilitates the rapidity of flow which helps greatly to reduce the amount of finance tied up in idle work in progress.

The volume of stock and work in progress in a business can be expressed in terms of the number of month's supply.

In a business which uses £3 million worth of material a month, then £9 million stock and work in progress represents three months usage; £6 million represents two months, and so on.

In such a business a reduction of stock and work in progress by the equivalent of one month's usage would release £3 million for other purposes. At 5 per cent, which is not an excessive rate of interest for these days, this means a saving of £150,000 a year.

THE SMALL UNIT

Even in relatively small undertakings, line production can ease the financing problems of a business and can pay handsome dividends in the form of reductions in cost and increases in the volume of output.

Mr. Ernest E. Butten, author of this article, is Chairman of the Management Consultants' Association, and Chairman of Personnel Administration Ltd.

To apply the principles of line production does not necessarily involve heavy capital investment; nor does it necessarily involve large numbers of men and machines.

But there are still many factories where flow production methods can be applied to only a small part of their work. Much of the jobbing work in the sheet metal industry is of this type and even some of the largest companies in the sheet metal industry are primarily large jobbing shops.

In these circumstances fork-lift trucks may be a better approach to the problems of factory layout and material handling than conveyors of the type used in the motor-car industry.

In a large jobbing shop trucks have advantages over mechanical conveyors because of their flexibility. If trucks are used, one product can be replaced.

The purpose of a production control department is to so organise a smooth flow of material and work as to make the best use of the factory layout, and it is extremely important that the sales department and the production control department co-operate closely and prepare programmes of the required output of finished articles.

Firm production programmes are normally fixed for one month ahead and tentative programmes for a further two months, making a total of three months in all. New programmes should therefore be set each month.

The production control department computes from these programmes of completed articles the material required and the work to be done in each section of the factory.

In planning the flow of material and components, careful attention should be paid to variations from item to item in the time required for production.

PARTS SCHEDULE

Specifications of all articles show the components from which they are built and the production control department applies the specifications to the programme of complete vehicles and explodes that programme into terms of the components required.

For each component the planned production time cycle is brought into account and thus are built-up programmes of the desired input of raw material and brought-out finished components.

These form the basis for the issue to suppliers of schedules of required deliveries.

ART OF SUPPLY

It is the duty of the production control department to ensure that production does not stop due to a failure of supplies. On the other hand, the general policy of mass production industry is not to hold heavy stocks but to organise the flow of material from suppliers so that it arrives shortly before it is required for use. This policy enables substantial economies to be made in the investment required in stocks and work in progress and in the space required for storage.

In a jobbing factory the problems are very different. The plant and layout are selected for their flexibility and it is difficult in a jobbing organisation to keep a high level of sales in a suitable assortment which will ensure a steady and balanced load.

Unless the situation is very carefully watched the order book gets out of balance with the plant capacity and certain machines have more work ahead of them than they can cope with, whereas other machines are underloaded.

In view of this, it is desirable in most jobbing factories to keep some form of machine loading records. These will show the load ahead on individual machines or on groups of machines. They may reveal the need for a change in sales emphasis so as to sell more products of the type on which the forward machine load is light and less products of the type where the forward machine load is heavy.

They may also show that overtime may have to be worked in order to balance production with sales, and this overtime may be necessary merely on certain machines or on certain groups of machines.

Machine loading records are essential if management is to be enabled to forecast the labour force required or the need to put work out to sub-contractors. Again, the records together with a long-term forecast of sales will be a basis for considering whether more plant should be bought.

WARNING

A word of warning is necessary about machine loading records. Unless they are accurate and up to date they can be not only useless but worse than useless because they may lead to faulty management action.

The most important aspects of works planning, however, lie deeper than in the techniques employed.

The best results are obtained only under a director who has the right general approach to his task, selects and develops his subordinates with care and ensures that the work of all departments is co-ordinated. The techniques of factory planning are largely the logical outcome of such an attitude of mind.

TEXTILE MACHINERY SHOW MARKS FASHION TREND

THE vast amount of machinery, processes and techniques employed to manufacture the everyday clothes we wear is now being shown at the Textile Recorder International Knitting Machinery Exhibition at Belle Vue, Manchester.

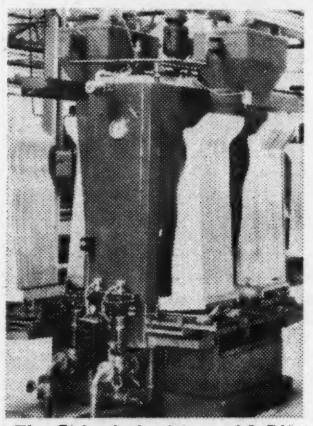
With the increase in popularity of seamless hose, machines have been developed with three- and four-feeder systems.

These machines are designed to produce a tubular stocking without heel or toe pouches at high speed. The pouches are closed by a sewing operation. Normal time for producing an average stocking blank with toe and heel pouches is about 16 minutes for a single-feed machine and 10 minutes for double feed.

The four-feed machines are able to produce a tubular stocking without pouches in 3½ minutes.

Winding machinery is of prime importance. Performance of knitting machines, as with other types of textile machinery, relies on the accuracy of the package formation produced by the winding machine as well as the quality of the yarn.

A rotary traverse machine, the Leesona style 44 Rotoconer, is capable of producing packages for warping or knitting up to 12lb,



The Girland plasticiser mk3 DH sets nylon hose or half-hose by the preboarding or postboarding method.

with winding speeds up to 1,200 yd/min.

The Tessilmeccanica Lombardia rotary traverse machine (U.K. agents Wagstaff and Son Ltd.) model N49, operates at speeds up to 1,100 yd/min. and includes a dust and fly removal system, and variable speed drive. Traverse lengths of 6, 7 and 8 in. are available with maximum cone diameter of 12 in.

A straight-bar machine for full fashioned outerwear, the Samco, exhibited by S. A. Monk (Sutton-in-Ashfield) Ltd., features an 8-head unit with knitting functions automatically initiated and controlled from a separate control console and sequence drum.

The Bently Group machines include automatic control by punched-card system.

Among many other exhibits are machines for manufacturing garment lengths, warp knitting and flat-bed knitting machines, and narrow fabric looms.

Dyeing and finishing exhibits include the latest oval paddle-type dyer by T. Bibby and Co., Halifax, which is suitable for dyeing nylon hosiery, Orlon and wool knitwear. Their largest model allows 350lb. of nylon hose or knitted garments to be dyed in one batch.

Other improvements in this branch by Sir James Farmer Norton and Co., Salford, include a new design of dye padding mangle suitable for use with circular woven fabric and a new type of precision coating machine which can be used for applying p.v.c. and other materials to knitted fabrics.

Special-purpose and speciality machinery is widely covered at the exhibition together with a range of ancillary equipment and accessories.

THE SECOND

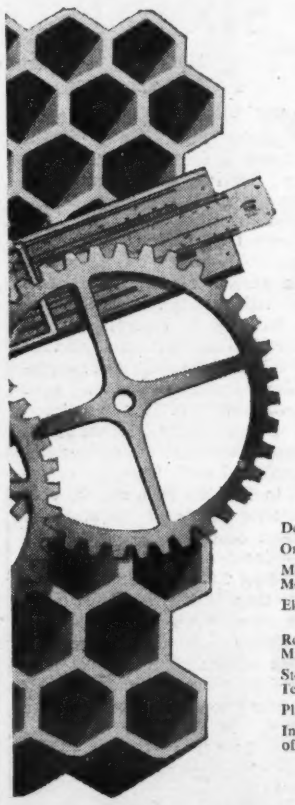
Engineering Materials and Design

EXHIBITION & CONFERENCE

13–18 NOVEMBER, 1961

EARLS COURT, LONDON

WEST BROMPTON ENTRANCE



Engineering designers must keep abreast of the latest developments in materials and methods. Because it displays the widest variety and newest examples of components, materials and design, **The Engineering Materials and Design Exhibition** provides an unrivalled source of information. New properties, new uses, new design trends . . . all evidence the way in which industrial research is meeting increasing demands. On the stands and at the conference, the occasion also provides a unique opportunity for the interchange of ideas and reveals many new ways of using materials to the best advantage.

Exhibits include

Acid resisting materials: Alloys: Anodes and salts: Anti-friction metals: Asbestos fabrics: Bearings: Belting: Beryllium: Brake linings: Castings: Ceramics: Compressed wood-fibre mouldings: Conduits: Corrosion resisting materials: Fibre glass: Hard facing materials: Heat resisting materials: Hose: Insulators: Metal coatings: Plastic Mouldings: Polyester resins: Rubber Mouldings: Wire.

Subjects and speakers at the Conference include:

SUBJECT	SPEAKER
Design Problems with Bluebird	L. H. Norris and K. W. Norris, **Norris Bros.**
Organisation of a Materials Department	F. C. Carpenter, **Smiths Aircraft Instruments Limited**
Metallurgy applied to the Selection of Metals	D. Birchon, **Royal Naval Scientific Service**
Elastomers in Engineering	D. A. Smith and D. G. Frank, **The National College of Rubber Technology**
Recent developments in Insulating Materials	J. Wainwright, **The English Electric Co. Ltd.**
Steels for the Design of Low Temperature Equipment	E. Gill, **International Nickel Co. (Mond) Ltd.**
Plastic Coatings	N. Vinson, **Plastic Coatings Ltd.**
Influence of Corrosion on the Design of Chemical Plant	E. Warde, **Henry Wiggin & Co. Ltd.**

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CHAncery 9011

VISIT THE INTERNATIONAL **Factory Equipment Exhibition** Earls Court **AT THE SAME TIME**

Third international congress on vitreous enamelling

40 BRITONS GO TO VENICE

BETTER enamel finishes achieved with thinner coatings and the wider use of enamel as a building material were forecast by lectures and discussions at the third International Congress on Vitreous Enamelling, held in Venice last week.

Over 300 enamellers from the U.S., Canada, USSR and most European countries, including 40 from Britain, attended the conference.

Three days were devoted to visiting factories and three to lectures.

The Bassano works of Smalteria Metallurgica Veneta makes holloware and enamel cooker parts on an integrated flow line including dipping of ground coat manually and by machine, and conveyor drying ovens, with transfer to monorail counter flow continuous furnaces.

An interesting feature is the use of electric resistance heating for the smelting of ground coat enamel.

Better finishes forecast with wider use of thinner coatings

For firing enamel on iron baths a continuous furnace with a circular hearth is used, twelve being suspended from a revolving umbrella.

Smalteria Metallurgica Padana at Bermago is a jobbing shop organisation concerned with a wide variety of sheet iron components, mainly for the refrigerator and cooker trades.

Features are the integrated conveyor systems for spraying and firing the sheet ware, and the spacious layout.

A feature of all the works visited is the two shifts of 16 or 18 hours worked by pickle, dipping and spraying sections to feed the continuous furnace operating round the clock.

Thus, minimum storage is required for the odd six or eight hours of night firing.

The Lecture programme covered many aspects of enamelling technique. The influence of lithium on the fusability and working properties of enamel was explored by Mr. W. A. Fenton of Canada who showed examples of lower firing temperatures obtainable by the use of up to 1 per cent lithium in the enamel batch, with consequent diminished rejects for distortion of steel shapes.

Two engineers from the USSR, Mr. Warghin and Mr. Michel, discussed the development of antimony enamels, which have been pursued vigorously in Russia, due to the lack of alternative materials as opacifiers.

Several lectures concerned physical and chemical reactions at the enamel metal interface.

Fish-scales

Mr. A. Petzold of Germany, described properties and pretreatments of ferrous metal and their influence upon the occurrence of fish-scales in enamel coatings. He provided evidence confirming the works experience of many enamellers regarding this phenomenon.

Messrs. Budnikov, Azarov and Migonadzhieva of the USSR reported upon investigations on the processes of formation of enamel coatings on aluminium.

They showed the effect of various constituents of the frit in securing adhesion, and the variation in results obtained when using them on different grades of aluminium.

The necessity of adequate cleaning and pre-treatment of the metal before application of enamel was indicated.

Mr. Huppert, U.S.A., described modern enamelling methods, and the efforts of steel makers to produce sheet with surfaces consistently low in carbon. This is an aid to securing good adhesion and freedom from blemishes in direct cover coat application.

An Italian delegate, Mr. Riva, dealt with recent developments in enamelled signs and the wider use of screen printing. Reflective finishes and luminous coatings provide wider scope, and electro luminescent panels are now emerging from development into production.

One coat

Developments in metal preparation for one-coat enamel application with particular reference to direct white were reported by an English delegate, Mr. Millar. Several methods had been examined including a range of acid solutions for etching, following upon degreasing and in some cases, a pre-heating of the metal. The methods require modification to suit different types of steel.

Present developments in production of steel with zero carbon surfaces indicate that sheets will soon be available which are better suited to direct application of enamel.

Mr. Biddulph, Great Britain, described the production of enamelled panels for architectural purposes, as veneer and as curtain wall infil. The wide range of colours, and of surface finishes, together with a variety of insulating backing has met the requirement of the architect for a versatile panel that has become widely popular in the increase of building activity in recent years.

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IMPROVED METHODS OF INDUCTION HEATING

A line of R.F. induction heaters in service with the Ford Motor Company, Basildon, Essex.

Many high production processes are best carried out by radio frequency heating . . . best because of its inherent controllability; best for blunt indisputable facts of economics.

ADVISORY SERVICE
Radyne Ltd are leaders not only in the theory of induction heating but also in the best ways of using it in practical, down-to-earth industrial problems. We will be happy to discuss your problems without obligation.

INDUCTION HARDENING
R.F. heating will harden components locally with the greatest precision, and is far quicker and cheaper than conventional methods of surface hardening, localised through hardening, and tempering.

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Soldering and brazing by induction are quicker and cleaner than by conventional methods. Localised heating restricts the flow of solder to the joint area. Both parts to be joined are raised to working temperature together. Scale and discoloration are reduced to a minimum.

THROUGH HEATING
In forging, stamping and other processes, rapid through heating to forging temperature saves time and space, reduces scaling and in consequence wear and tear on dies, improves dimensional accuracy and gives better working conditions.

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Localised annealing between processes can be carried out with greater speed and control by induction methods than by any other.

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P.7020

ONE IN SIX USE NIFES

ONE in six of all the companies who consulted the National Industrial Fuel Efficiency Service last year were from the engineering and metals industries.

Formed in 1953 at a time of acute fuel shortage, NIFES is now in a period of fuel abundance. With rising costs and falling profits industry is reported by Sir Leslie Hollinghurst, chairman of NIFES , as being "far more appreciative of the advantages to be gained from NIFES advice."

The recent annual report of the service shows that the serious loss of technical staff, from 219 engineers to 192, has been met by concentrating the staff in areas of greatest demand.

Engineers of the National Industrial Fuel Efficiency Service made more than 11,000 visits during the year, carrying out fee-earning work for 1,441 clients—585 of them new to the service.

The principal groups making up the year's total were textiles and leather, 347; engineering and metals, 230; food drink and tobacco, 221; non-industrial premises, 132; chemicals, 106.

At the centre of NIFES activities is the investigation of combustion conditions in boiler plants Thermal efficiency tests were carried out on 465 boilers during the year.

It is estimated that fuel consumption of boiler plant dealt with by NIFES engineers falls, on average, by one ton in seven.

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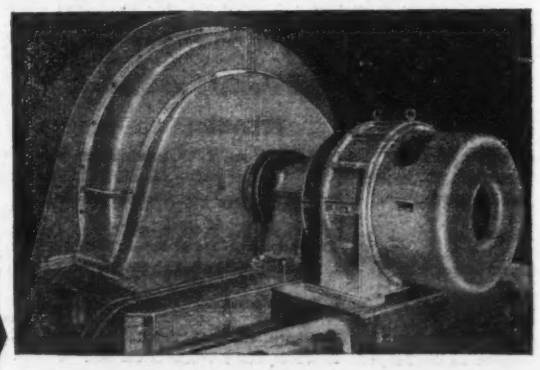

The illustration shows a Synchronous Motor and Exciter incorporating a "Harviglas" endshield and cover, typical of the wide range of Fibre Glass mouldings we produce for industry.

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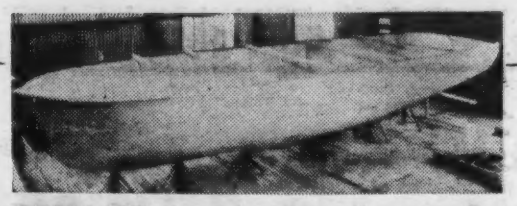


Windboats to launch concrete boat

A 34ft. BOAT with concrete hull is soon to be launched by Windboats Ltd. of Wroxham. The material, called Seacrete, is claimed to have the strength of steel and to be resistant to water, fire and corrosion.

It is claimed that hull costs can be considerably reduced and by moulding in one piece, space is increased due to absence of internal frames.

Low thermal conductivity ensures a more even temperature below deck, and superior insulant quality gives quieter running. Maintenance costs are confined to repainting.

The boat is to be named Tradewind and is powered by a B.M.C. Commander 2.2 litre diesel with self-change gear box.

A further three craft will be available in 1962 and a special four to six berth cabin cruiser is to be shown at January's International Boat Show in London.

Cast nylon possible

IMPROVED chemical knowledge has made it possible to shorten the processing of nylon and permit the manufacture of larger components.

The Polymer Corporation of Reading, Pa. have perfected a method which eliminates heating of raw material in a vacuum and under pressure for 16 hours.

It can now be cast directly without loss of original characteristics.

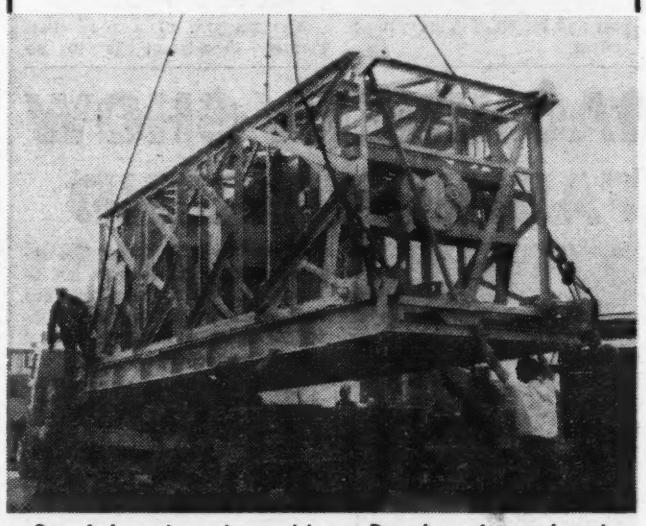
Rods up to eight inches diameter and plates up to eight feet by four feet with a thickness of four inches can be produced.

The Monsanto Chemical Co. developed the formula.

OPTICAL WORKS

C. A. Parsons & Co. are to build a new laboratory and production building at their optical works at Newcastle-on-Tyne.

WEITZ CRANE No. 2 HERE FROM FRANCE



One of the main sections arriving at Dagenham of two telescopic tower cranes imported from France by the Modular Concrete Company. They are at work on the University of Sussex contract near Brighton. Interlocking safety devices are claimed to be almost foolproof.

A SECOND telescopic tower crane with working height of 240ft. has been imported by Modular Concrete Co. for use on their University of Sussex contract at Falmer, near Brighton.

The crane, a Jules Weitz S.A.—G 140, is only the second brought to this country by Babcock and Wilcox, sole importers, agents and manufacturers under licence in this country.

The G 140 has a basic height of 43ft. and an 8ft. square tower. Telescopic sections of 20ft. enable the crane to be raised to a maximum height of 240ft. when anchored to a building. Maximum height for free travelling in winds up to 40 m.p.h. is 161ft.

The crane saddle jib is 98ft. 6in. long and can slew at a rate of 3/5ths turns per minute.

Maximum hoisting capacity is 10 tons at 33ft. per minute with counterweight ballast of 10 tons. Fastest lifting speed is 328ft. per min. for loads not exceeding 25 cwts.

Travelling speeds up to 66 ft./min. are possible along the track.

Three-speed gear-change capable of operation with load on the hook, interlocking safety devices, and independent mechanism for self-erection, are among the design features of this crane.

Synthetic rubber expansion pieces

EXPANSION pieces in steam turbo-generator, condenser water circulating systems are being made of synthetic rubber. It reduces vibration and takes up misalignment.

Neoprene expansion joints are being used in the Central Electricity Generating Board's Blyth power stations.

The 48in. bore units are fitted close to the condenser water boxes and pass sea water.

The expansion piece on the inlet side of the water box is under pressure and the unit on the outlet side under vacuum, the circulating water system being siphonic.

Working pressures, vacuums and temperatures vary with tidal conditions. Hitherto, these joints have been stainless steel or copper. The new material is an answer to vibration, fatigue cracking, and age-hardening.

Friction-fabric

The expansion pieces are reinforced with either Nylon or Terylene frictioned fabric, and have internal diameter thicknesses from 1¼in. to 72in. bore.

Thickness of the fabric-reinforced Neoprene when built into the final unit varies from ¼in. to ⅜in.

The use of Neoprene is recommended by the manufacturers at continuous temperatures of up to 80 degrees C., but for exceptional conditions over short periods, up to 100 degrees C. can be withstood.

For small bores up to about five or six in. diameter, working pressures of 200lb. p.s.i. can be handled, and for the larger bores up to 50 lbs. p.s.i.

Flexibility is a special feature and all expansion pieces are tested to double working pressure by the manufacturers at their works.

Other projects in the U.K. using these expansion pieces include the new power stations at Portishead, Kincardine, Padiham, and Dungeness.

The expansion pieces are manufactured by Andre Rubber Co., Surbiton, Surrey, from Neoprene supplied by the Du Pont Co.

NEW Equipment

Multi-level, mobile platform rises 40ft.

A HEIGHT of 40ft. can be reached with this multi-level maintenance platform which can accommodate several men. At lower heights it can be adjusted to form a horizontal, cantilevered platform on which a number of men can work at the same time.

A 24-volt push-button control unit is provided on the working platform itself.

Safety locks limit the travel of the platform and a proximity cut-out prevents it being lowered inadvertently on to vulnerable parts such as aircraft control surfaces.

The complete unit weighs three tons but the low friction characteristics of the polyurethane wheels allow it to be moved about by only two men. **Mercury Airfield Equipment Ltd., Gloucs.**

Reader service reference No. 34

MULTI-LEVEL PLATFORM
Mobile and safe

Dial thermometers

Vapour pressure operation is used for Teddington KDA dial thermometers which are obtainable in both 2in. and 4in. sizes.

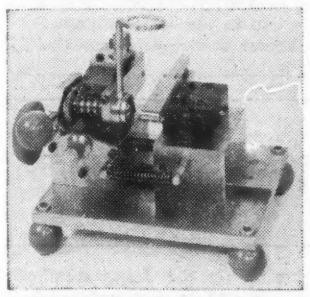
Various temperature ranges from −40°C. to +75°C. are available and the instruments are accurate to within ± 2 per cent. of full scale deflection.

Standard capillary length is 5ft., and 10ft., 15ft., and 25ft. lengths are also available.

A recalibrating screw is provided at the back of each instrument. Casings are normally of stove-enamelled mild steel and bezels of chromium plated brass. **Teddington Refrigeration Controls Ltd., Sunbury-on-Thames, Middx.**

Reader service reference No. 35

Fine-wire welder



FINE-WIRE WELDER
Accurate alignment

Accurate, concentric alignment of wires from 0.006in. to 0.040in. diameter is obtainable with a new unit designed for use with the Spembly Capacitor Discharge Power Pack.

Both similar and dissimilar materials can be welded with its aid.

There are two wire holding members, one fixed and the other movable, the fixed member carrying a quick-release collet which enables one of the wires to be aligned in two planes by micrometer-controlled vee slides.

The moving member has a sensitive clamp for securing the second wire (this may be of a different diameter to the first), both members being insulated from the base and fitted with electrode leads.

Alignment of the wires is facilitated by a magnifying head which can be swung over the discharge gap between the wires. Alternatively a twin viewing head can be provided.

Welding is accomplished by rotating a controlling screw which brings the two wires together and completes the discharge circuit.

An automatic version of this unit is also available for certain types of production work. **Spembly Ltd., New Road Avenue, Chatham.**

Reader service reference No. 36

Light conveyor

A main boom constructed from 14 gauge aluminium helps to keep the weight of the Conveyorette portable conveyor down to 2½ cwt. in the 12-ft. version.

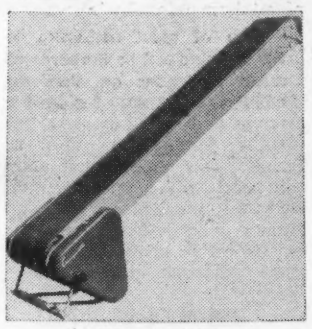
The unit is designed for such jobs as lorry loading, stacking, and horizontal conveying and is fitted with two 5in. retractable rubber-tyred wheels for ease of movement.

Power is provided by a ¾-h.p. electric motor. Motor, drive, switchgear and return band are all totally enclosed.

Self-lubricating bearings reduce maintenance to a minimum, only the gearbox and wheels requiring occasional lubrication.

A simple rotary switch gives forward, stop and reverse control, and the belt speed is approximately 60ft./min., depending on the load carried.

Two boom lengths, 9ft. and 12ft., are available, and the recommended maximum distributed load is 1 cwt. in each case. **Gardiner's Conveyors Ltd., 10 Lafone Street, Bermondsey, London, S.E.1.**



LIGHT CONVEYOR
Simple controls

Reader service reference No. 37

Air purifier

Odours, smoke, dust, and carbon particles in the air are oxidised and quickly destroyed by negative ions produced by Vita-Aire air purifying equipment.

A considerable study of the effects of negative ions has been made in the U.S. and equipment of this type is now accepted in that country in all industries where there is a problem of mould, mildew, odours, airborne bacteria, smoke, dust, dirt or gases.

A range of 12 ion generators are available for laboratories and workshops between 4,000 and 15,000 cu. ft. in volume.

They fit into plastic cabinets measuring 13⅜in. by 9¼in. by 6¼in., the cabinets housing the circulating fans.

For industrial use there are at present eight generators for work spaces of up to 200,000 cu. ft. **Thermotank Ltd., 60 Rochester Row, London, S.W.1.**

Reader service reference No. 38

Reach truck

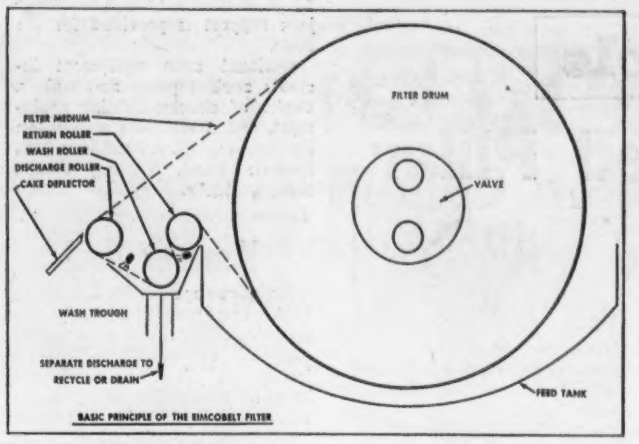
A pantograph mechanism controlled by a central ram is a feature of the Hyster-Ransomes R25A reach truck. Steering and drive mechanisms form an integral unit which turns with the steering/drive wheel.

A seat is provided for the operator who is positioned laterally and thus never has his back to the line of travel.

Turning radius is 54¾in. and required aisle widths when carrying a 40in. by 40in. pallet are: intersecting, 55in., stacking, 65 in.; angular movement is up to 200°.

There is a 12-ft. lift on the standard model but 8ft. and 10ft. lifts are also available, all with a load capacity of 2,500lb. at 20in. centres. **Hyster-Ransomes Division, Ipswich.**

Reader service reference No. 39



ROTARY FILTER
Continually cleaned

Rotary filter

Continuous cleaning of the filter cloth without the use of a scraper is the outstanding feature of EimcoBelt filters now being manufactured in the U.K. to American designs.

They can be operated continuously at 80-90 per cent. of peak capacity, performing as efficiently at the end of a run as at the beginning.

In each filter cycle the belt is removed from the drum and passed round a small diameter discharge roller. The sharp change in radius causes the cake to break away from the belt, which then passes round a wash roller to be cleaned on both sides by high-pressure jets.

The filters are to be made in standard sizes ranging from 18in. diameter by 12in. face to 14ft. diameter by 16ft. face. A range of filter media are available, including a corrosion-resistant woven metal belt.

Belt changing is simplified by zipp joints in the belts. **Eimco (Great Britain) Ltd., Earlsway, Team Valley, Gateshead, 11.**

Reader service reference No. 40

Spray plant

Latest addition to the Graco Hydra-Spray range is a 5-gal. model weighing only 37lb.

Air at normal line pressure is used to operate a high-pressure pump which produces a pressure of approximately 2,000lb./sq. in.

The equipment is supplied complete with pump, air-driven agitator, spray gun with tungsten carbide spray tip, blow gun for cleaning the spray gun, hose swivel and 20ft. of hose. **Alfred Bullows and Sons Ltd., Long Street, Walsall, Staffs.**

Reader service reference No. 41

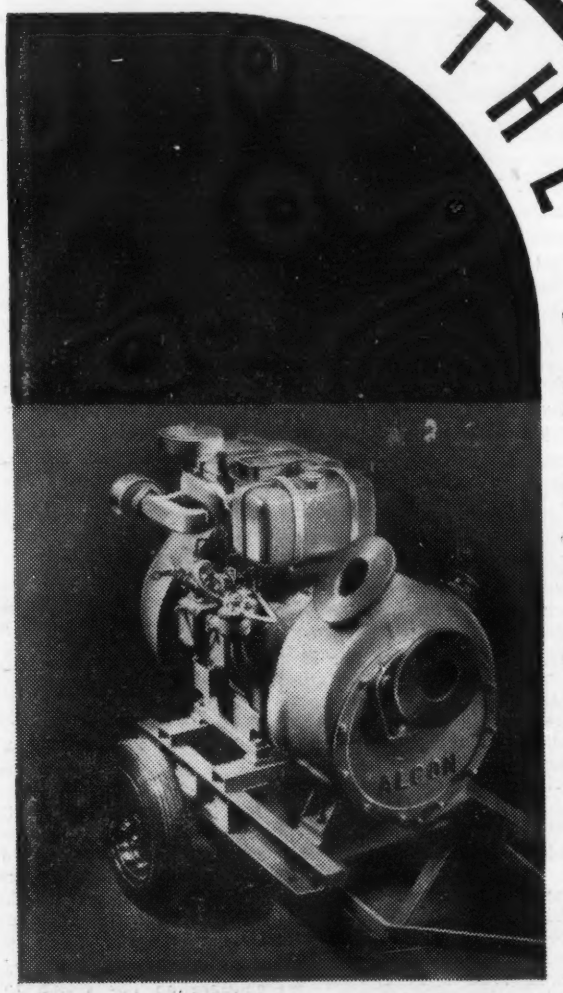
READER GUIDE

ON this page we publish the latest information on new equipment of interest to engineers.

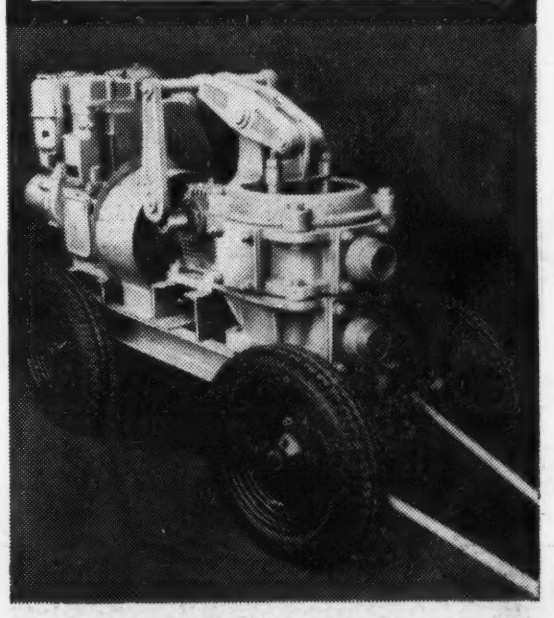
Included: Inspection and test equipment, production machinery, and measuring and control equipment. Fill in the Reader Service Card on page 19 for further details of any items on pages 17 and 18.

THE INDISPENSABLE

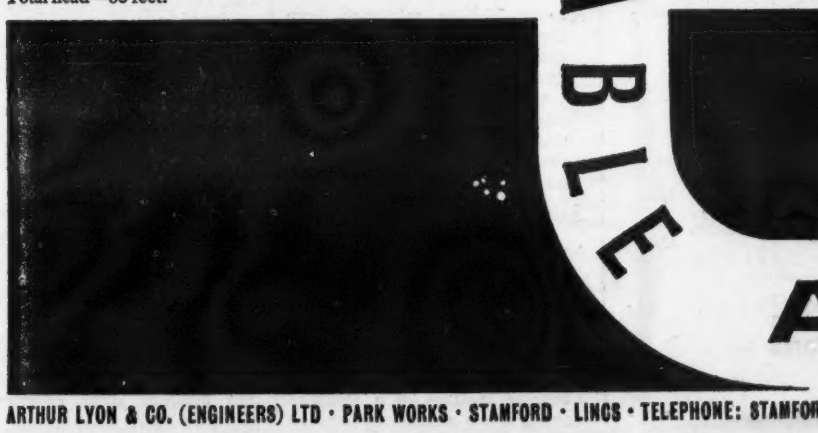
Fluid handling, all over the world, is effected with economy by the ALCON range of pumps. Civil Engineers, builders' contractors, industrialists, public services, will find their requirements met by the range—from 1½" to 8" capacity, 500 to 100,000 Imperial Gallons per hour output. The range includes ALCON Self-priming centrifugal pumps, diaphragm and disc pumps, and the ALCON Thames single stage centrifugal pumps. Write for full information.



This is the 4" heavy duty, self-priming centrifugal pump of robust construction and compact design. It is particularly suitable for use in major drainage schemes of all kinds and will stand up well to rough handling. Output—30,000 gallons per hour. Total head—80 feet.



Principally designed for Civil Engineering and Contracting work, the new ALCON 3"/4" Diaphragm Pump is of the lift and force type using two diaphragms to give equally distributed loading.

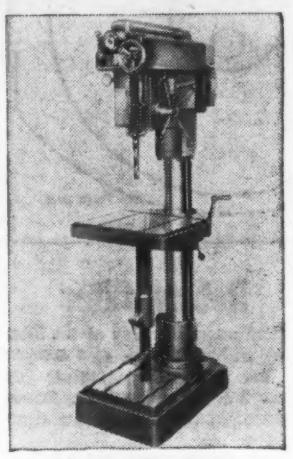


ALCON

ARTHUR LYON & CO. (ENGINEERS) LTD · PARK WORKS · STAMFORD · LINCS · TELEPHONE: STAMFORD 2552 · GRAMS: ARLEOCO, STAMFORD, LINCS

NEW Tools

Power-feed Pillar drill



POWER-FEED DRILL
Variable speeds

INFINITELY variable spindle speeds from 170 to 1,400 r.p.m. and three power feed rates of 0.004, 0.008, and 0.012 in./rev. are provided on the Pacera type MF7 pillar drill.

The actual spindle speed in use is indicated on a tachometer at the front of the head. Speeds may be changed while the machine is running and an accessible hand wheel gives positive adjustment of belt tension.

Drilling capacity in mild steel is 1¼ in. diameter and spindle travel is 6 in. Throat depth of the machine is 11½ in. and the working surface of the table measures 15 in. by 19 in.

The column is of solid steel 5½ in. in diameter and a telescopic jack support is provided for the table.

Optional extra equipment includes coolant pump and tank, a choice of chucks, lighting equipment, and a reversing mechanism for tapping. **W. J. Meddings Ltd., Ipswich Road, Trading Estate, Slough, Bucks.**

Reader service reference No. 42

Hammer drill

An advantage of the Duax ZL. 13/A two-speed hammer drill (pictured right) is that on a typical electrical or small-bore heating installation job it can produce a hole in a wooden skirting, the brickwork behind it, and even small aggregate concrete with one drill insert.

The slender shape of the hammer head allows the tool to be used close into corners and it can cut holes up to 2½ in. diameter to a depth of 14 in.

Drilling speeds are 500 and 1,300 r.p.m. and hammer speeds 7,500 and 13,000 impacts per minute.

If the hammer head is removed the tool can be used as a normal ½in. heavy duty drill. **Trend Industrial Equipment Ltd., 77 Dudden Hill Lane, London, N.W.10.**

Reader service reference No. 43

HAMMER DRILL
Bores wood, concrete

Centre lathe

Infinitely variable spindle speeds from 400 to 3,000 r.p.m. and an additional geared drive range of from 50 to 375 r.p.m. are available on the Cazeneuve 360 HB-X centre lathe.

Swing over bed is 14¼in., over cross slide 7 15/32in. The maximum length which can be turned is 28¼in.

Optional extras include a special tailstock unit for both sensitive and machine-feed drilling, and a hydraulic copying attachment. **Fenter Machine Tools Ltd., 184 Aston Road, Birmingham, 6.**

Reader service reference No. 44

Tube bender

A compact manually operated bender has been designed for the small diameter tubing now employed for most electric, gas and water appliances, as well as in many industrial applications.

It is claimed that excellent bends can be made without heating or filling the tube and no work bench or stand is needed.

Quicksets are made in eight sizes, covering tube sizes from ¼in. o.d. up to ¾in. bore copper. **Chamberlain Industries Ltd., Staffa Works, Argall Avenue, London, E.10.**

Reader service reference No. 45

Enclosed wrench

An enveloping pressed steel handle not only prevents thread damage on the moving jaw of the Fabwrench but gives additional protection against injury to the user.

Jaws are of heat-treated, drop-forged steel.

Three models are offered, with jaw capacities from ⅛ in. to 1¼ in. and the tool is recommended for use on broken studs, damaged nuts and bolt heads, and locking rings. **Fabrex Tools Ltd., Bernard Road, Sheffield, 2.**

Reader service reference No. 46

stainless steel tubing
FROM 3 TO 12 INCH DIAMETER
in unlimited-length straights
AUTOMATICALLY CONTINUOUSLY WELDED
at greatly reduced prices

Advanced fabrication methods enable speedy delivery and reductions in the order of 30/40% for 3″ tubing, 15% for 10″ tubing, 6% for 12″ tubing. Greater strength allows reduced wall thickness—greater economy. Electronically controlled micro-metric accuracy spiral welding. Stringent pressure tests e.g. 3″ bore, tested to 1,000lbs. p.s.i., 12″ bore, tested to 500lbs. p.s.i.

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INDUSTRIAL APPLICATIONS

NEW Publications

Detailed information together with excellent sectional drawings of 38 applications of INA needle bearings to mechanical handling and construction equipment are given in a technical information booklet, Series 14/2, from INA Needle Bearings Ltd.

Reader service reference No. 47

A Design Manual has been produced by George Angus & Co. giving information on Bellofram Rolling Diaphragms — long-stroke constant area diaphragms which are responsive to extremely small pressure changes and possess very low hysteresis qualities. They combine many of the functions of both bellows and diaphragms.

Reader service reference No. 48

Foliac Applications Handbook, a booklet from Graphite Products Ltd., gives a summary of the numerous industrial uses of Foliac graphite preparations and a guide to the technical literature available on them.

Reader service reference No. 49

Properties and applications of the Industrial Molyslip range of molybdenum disulphide products are described in an illustrated booklet called **Keeping Things Moving in Industry,** obtainable from Monks & Crane Ltd.

Reader service reference No. 50

A new 24-page catalogue from Desoutter Brothers Ltd. gives details of standard die sets produced by this firm. Over 2,000 variations can be supplied from standard components and non-standard sets can also be produced to customers' requirements.

Reader service reference No. 51

An informative design manual has been produced by C. A. Norgren Ltd. on their Micro-Fog machine lubrication system. Norgren equipment provides for precise and constant metering of oil delivery to the different bearing surfaces of a machine and has been successfully applied to the lubrication of dental handpieces running at 450,000 r.p.m. and to 34in. bearings turning at less than 100 r.p.m.

Reader service reference No. 52

A booklet called **Fork Truck Stability Tests** is now available from the British Industrial Truck Association, 94 Petty France, London, S.W.1, price 2s. 6d.

For some years the design of fork trucks for safe operation has been based on the consideration of longtitudinal stability only but experience has proved that other factors should also be considered, and these tests have been drawn up in co-operation with associations of manufacturers both in Europe and the U.S.

Reader service reference No. 53

Man-manager relationships in industry is the subject of the main article in the October issue of **Works Management,** the journal of the Institution of Works Managers.

It is based on a paper presented at the Institution's recent International Conference at Bournemouth and gives an American's view of the role of management in industrial relations. There are also a number of short articles on trends in packaging.

Reader service reference No. 54

Solid raw material forms of P.T.F.E. are produced in a number of grades for different applications by Crane Packing Ltd. **Information Bulletin No. 17** from this company deals with grades 7 and 8, supplied as mouldings, extrusions, tubing, or in component forms.

Grades 7 and 8 are intended for the manufacture of components with one or more bearing surfaces and they contain glass filament reinforcement in addition to the basic polymer.

Reader service reference No. 55

CODES FOR HEATING ENGINEERS

WORLD STANDARDS

THE ever increasing change over from solid-fuel heating to oil heating, at first in industry and in more recent years, in family dwellings, has created a need for more heating engineers. This has resulted, in there being today, a large number of heating engineers entering this field of industry with little or no experience of the many problems associated with the installation of oil burning equipment.

To meet the need for giving guidance on this subject to all users and manufacturers of oil burning equipment the British Standards Institution, at the request of the Institution of Heating and Ventilating Engineers, and in conjunction with the Institution of Mechanical Engineers, are in the process of preparing a series of codes of practice on "Oil Firing Installations", which will be published in three parts.

Oil equipment

The recently published Part I (CP3002: Part I: 1961) concerns oil burning equipment for heating boilers, air heaters and cooking appliances connected to flues, designed for burning Class D oil and coal-tar fuel CTF50, which in the main is used by the atomising type of oil burner in small and medium sized installations, generally associated with large dwelling-houses, where the heating load is in excess of 75,000 B.Th.U. per hour; large residences and small industrial installations.

The engineer will be able to obtain information relating to the selection and location of oil storage tanks and ancillary equipment; the design and construction of tank chambers; accommodation for boilers and selection of types of oil burners available.

Also of great assistance to the engineer will be the accepted recommendations on standards of fire resistance for boiler rooms and tank chambers.

Other parts of the Code of Practise now under preparation will deal with vaporising oil burner installations, and oil burners suitable for burning the heavier grades of oil used by the larger industrial installations.

Cast iron boilers

Also in the field of heating, engineers requiring guidance on cast iron boilers for central heating and hot water supply installations having a load demand in excess of 150,000 B.Th.U. per hour and an operating pressure not exceeding 15 lb/sq.in. will be able to consult the revised British Standard BS 779 : 1961 Cast iron boilers for central heating and hot water supply.

The standard is particularly applicable to steam boilers coming within the duties mentioned above and to hot water central heating boilers designed for operating in open systems at pressures not exceeding 120 ft. head or 52 lb./sq.in. at 212 F; or medium pressurised systems designed to operate at a pressure of 50 lb./sq.in. at a maximum working temperature of 250°F; also for direct hot water boilers within the range 55,000 to 2 million B.Th.U. designed to operate at a pressure of 120 ft. head or 52 lb./sq.in. at a maximum working temperature of 250°F.

Fuel guide

The efficiency to be expected from the different classes of boilers covered by the standard is given to assist the engineer in the selection of a boiler for a particular application. Information is also given on the type of fuel to be used including requirements for the rating of each boiler on performance.

Requirements for the construction and the testing of the boiler, together with the material specification, mountings and appliances will also assist the engineer from the design point of view and the user in installing a boiler.

Other useful information includes that for assisting engineers in assessing values for smoke density when testing oil fired boilers.

NEW Components

High pressure shaft seals introduced

TWO mechanical seals for shaft sizes from 15 to 100 mm., rising in 5 mm. steps, and with a pressure ceiling of 1,500 lb./sq. in. for most operating conditions, have just been introduced.

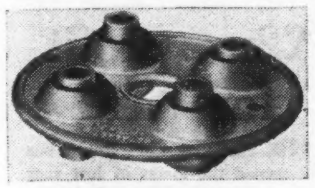
Positive drive is transmitted to the pressure compensated carbon seal faces by means f keyways. Type 51B incorporates rubber O-rings and is designed to seal against air, water, mild chemicals, solvents, lubricating oils and refrigerants.

Type 52B has no rubber components and is recommended for highly corrosive service. Heavy duty seals of this type can also be made to order in sizes above 100 mm. **Crane Packing Ltd., Slough, Bucks.**

Reader service reference No. 56

Universal coupling

High torque capacity in relation to size is claimed for the Metalastik universal coupling which incorporates four bonded rubber seatings to accommodate angular misalignment and shock loads.



UNIVERSAL COUPLING
High torque capacity

They are recommended for drives where only limited torsional flexibility is required. There are no wearing parts and no lubrication is needed.

Three models are available for maximum torques of from 15 to 150 lb. ft. and torsional ratings from 6 to 90 lb. ft./deg.

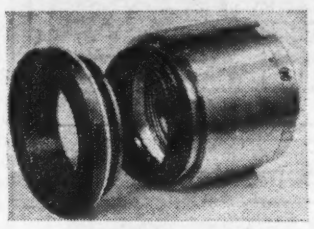
Diameters vary between 2½ in. and 4¾in. The couplings are designed for normal deflections (misalignments) of 5 deg. They can withstand end thrusts, and they can run at high speeds without centring devices. **Metalastik Ltd., Evington Valley Road, Leicester.**

Reader service reference No. 57

Cut-cost calorifier

Improvements in the design of the Royles type D calorifier allow maximum working pressures of 150 lb./sq. in. for steam and 100 lb./sq. in. in the water circuit, and it is claimed that costs can be reduced by as much as 40 per cent.

Both vertical and horizontal models are available in 12 sizes covering outputs of up to 16 million B.Th.U. /hr.



MECHANICAL SEALS
For shafts 15 to 100 mm.

Indented copper tubing is used for the heat exchange surfaces.

The tubes can easily be withdrawn for cleaning or inspection and individual tubes can also be detached. **Royles Ltd., Irlam, Manchester.**

Reader service reference No. 58

Cheaper lock nuts

Precision forging as the basic manufacturing method in place of turning from the bar has reduced the prices of certain sizes in the Nyloc self-locking nut range.

The sizes concerned are from 1 in. to ¼ in. U.N.F. in both full and thin thicknesses.

Nyloc nuts have nylon inserts which bear on the threads of the bolt or stud to give vibration-proof self-locking characteristics.

They are re-usable, do not deform the bolt threads, and provide a leak-proof seal. **Simmonds Aerocessories Ltd., Treforest, Pontypridd, Glamorgan.**

Reader service reference No. 59

Pedal switch

A new foot-operated industrial switch can be mounted in apertures in machine bases or, with total enclosure, installed as independent units.

Igranic heavy duty contactor gear is incorporated and both two and three pedal models are available.

A quick-release mechanical interlock device is fitted but this can easily be removed if electrical interlocking is required. **Charles Taylor (Birmingham) Ltd., Bartholomew Street, Birmingham, 5.**

Reader service reference No. 60

Anti-thief device

It is possible to use a new Lucas S.45 Anti-Theft Master Switch in a number of different circuits to prevent thefts both of and from cars.

The simplest arrangement is to wire it in series with the standard ignition switch so that two locks have to be forced before the vehicle can be driven away.

It can also be connected so that if the normal ignition switch is operated the horn or an alarm is sounded.

Alternatively, the master switch can be linked to a number of other switches placed so that they will be operated should a door or bonnet be opened. **Joseph Lucas Ltd., Great King Street, Birmingham, 19.**

Reader service reference No. 61

Thermostats

No baseplates are required for the installation of G.E.C. 628 thermostats as they can be screwed to any B.S. conduit box or direct to a wall.

Protective windows in white plastic casings prevent unauthorised interference and protect the mechanism from dirty conditions.

G.E.C. THERMOSTAT
No baseplates required

Switching arrangements are with 10 amp or 20 amp ratings, and the temperature range is 40-80 degrees F. **The General Electric Co., Ltd., Magnet House, London, W.C.2.**

Reader service reference No. 62

NEW Materials

Finned heater element 'more efficient'

BY using helically wound angle section in place of the more usual corrugated strip, it is claimed that Eltrofin finned heating elements are less likely to trap water and dirt and that the loading in watts per inch can be two or three times the loading of an unfinned element without increase in surface temperature.

The elements have been employed successfully in both oil immersion heaters and in air heating equipment. **Eltron (London) Ltd., Strathmore Road, Croydon, Surrey.**

Reader service reference No. 63

Non-metallic shot

Costing only one-fifth the price of conventional metallic abrasive, No-Met is intended for site operations where recovery of the abrasive material is impossible.

Recent trials on bridges, ships' hulls and oil tanks have left steel surfaces with an excellent key for priming paints. The material is silica-free. **Bradley's (Darlaston) Ltd., Darlaston Iron Works, Darlaston, Staffs.**

Reader service reference No. 64

Coloured dyelines

Ammonia developed papers produced in four standard colours, pink, yellow, blue or green, providing for easy segregation of different types of drawing are now available.

They are also handy to separate one department's work from another. **Lawes Rabjohns Ltd., Abbey House, Victoria Street, London, S.W.1.**

Reader service reference No. 65

READER ENQUIRY SERVICE

Please circle the reference number on the item on which you would like fuller details. Post to Reader Service Department, Engineering News, Heywood & Co. Ltd., Drury House, Russell Street, Drury Lane, London, W.C.2.

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FINANCE AND COMMERCE

CAR EXPORTS OUTLOOK BETTER

Sports cars lead revival as stock piles fall in buoyant U.S. markets

A ROUSING revival in the export performance of the British motor industry is now widely expected.

With certain models doing far better than others the car companies are looking both to the U.S. and to Europe for greater sales.

British Motors are again doing well with their sports cars in the North American markets. A company executive said:

"We are now getting back to shipping 900 sports cars a week to overseas markets, mainly to the U.S. We are aiming at sending between 40,000 and 50,000 cars to the U.S. in the current financial year plus another 25,000 to Canada."

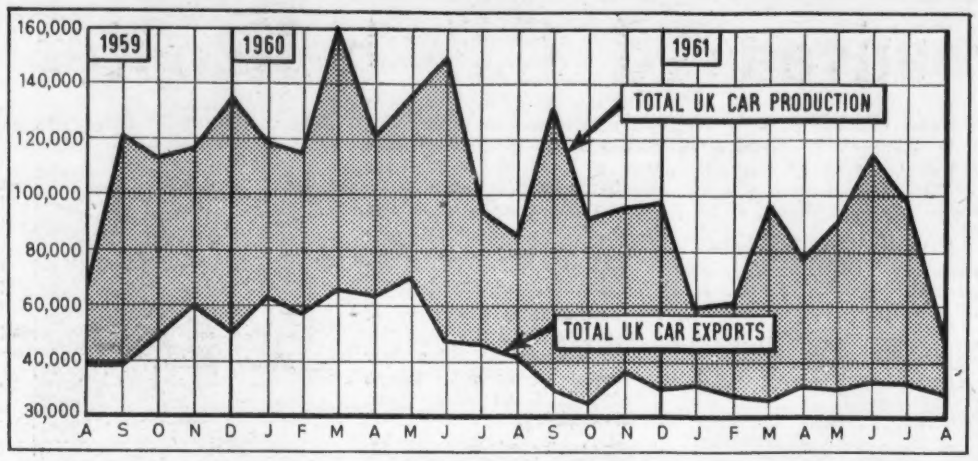
Output of the BMC babies, the Mini-Minor and the Austin Seven, is now running at 4,000 a week, and about 1,000 of those go overseas.

Vauxhall's, pleased with the reception given overseas to their new Victor model, said from their Luton headquarters: "We are looking now to an upturn in exports.

"Indications are that we are going to ship a good many more cars overseas."

Despite the Common Market members imposing a tariff of 18 per cent on cars traded between themselves, and 28 per cent on those coming in from Britain, the car makers have sold 33,000 cars in the Common Market in the first 7 months of 1961, against 50,000 last year.

Tariff or not the Ford Anglia and now the Consul Classic are selling well and BMC is vigorously tackling the West German market.



2 ACOUSTIC MACHINE ENCLOSURES

Tailor-made for each specific application, Burgess acoustic machine enclosures give complete sound-absorbent cover around heavy plant machinery, ensuring elimination of disturbing noise. Ventilation (natural, or forced through acoustically treated vents) can be incorporated. Soundproof doors, and double glazed windows if required.

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packs a *punch!*

the Thor 15D Utility Hammer-Drill

When, *asks Tommy Thor*, is a self-rotating drill a non-rotating hammer ?

When it's a Thor 15D Utility Hammer Drill! It drills concrete, stone etc. and at the flick of lever converts instantly into a non-rotating hammer. No other hammer in this class has this feature.

It's the Thort behind our tools that makes 'em so unique.

R65

Thor POWER TOOLS

THOR TOOLS LTD

NEW COMPANY NAME OF ARMSTRONG WHITWORTH & COMPANY (PNEUMATIC TOOLS) LTD
Main Sales Office: 34 Victoria St., Westminster, London, S.W.1.
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ENGINEERING CONTRACTS

CEGB £325,000 Pumps order

THE Central Electricity Generating Board's West Burton power station is to have circulating water pumping equipment, worth £325,000, made by Gwynnes Pumps Ltd., an associate company of W. H. Allen, Bedford.

Eight Gwynne 78 in. by 80 in. horizontal, double-entry, split casing centrifugal pumps, will be provided, each for a duty of 130,000 gallons per minute against a total head of 70 ft.

★ ★ ★

Double deck, 30 ft. long Leyland Titan buses have been ordered from the Lancashire heavy vehicle makers by the island of Mauritius. The Titans, powered by 150 h.p. Leyland 0.680 diesel engines and equipped with air brakes will be shipped in sections.

★ ★ ★

Motokov, the Czechoslovak buying agency, has placed its sixth motor-cycle order with Norton Motors, of Birmingham, bringing the value of contracts placed since 1959 to £100,000.

★ ★ ★

Westinghouse Brake and Signal have received contracts worth more than £617,000 from British Railways, North Eastern Region, for the main technical equipment for the new mechanised marshalling yards near Wakefield.

★ ★ ★

South African Railways have bought 100 AEC buses for their road services. The contract was won by the Middlesex firm against competition from European and U.S. firms.

★ ★ ★

Orders worth over £2 million have been placed with two Sunderland shipbuilders, Austin and Pickersgill Ltd., and William Doxford and Sons Ltd.

Doxford's are to build a 14,500-ton motor ship for the West Hartlepool Steam Navigation Co.

Trade agreements

AERO ENGINES FIRM FORMED

NAPIER AERO ENGINES LIMITED, jointly owned on a fifty-fifty basis by D. Napier & Son and Rolls-Royce, has been formed in accordance with previously announced arrangements and will carry on the aero engine business of D. Napier & Son. The chairman will be Mr. J. D. Pearson, chief executive and deputy chairman of Rolls-Royce.

Perkins' 'Perpetuity Plan'

RECONDITIONED diesel engines have become valuable export business for the Perkins engine group, the Peterborough subsidiary of the Massey-Ferguson international agricultural engineering concern.

Output of reconditioned engines has now reached 10,000 a year, four times the 1945 level.

The company calls its scheme the Perpetuity Plan and gives factory-rebuilds the same guarantee as with new engines.

Customers have ordered Perpetuity engines from export markets as far apart as Canada, West Germany and Malaya.

R & D CUTS STAVELEY PROFITS

A £290,000 drop in the before-tax profits of the Staveley Industries engineering group is mainly explained by greater spending on research and development and by certain non-recurring losses.

Group profits before-tax are down from £1,675,843 for the year before to £1,385,404. The net surplus has declined from £812,718 to £583,551.

ANGUS' PROFIT MARGIN FALLS

POWER transmission engineers, George Angus, have announced an unchanged interim divided at 7½ per cent.

Sales by the company in the first eight months of the year have increased over the similar period of last year but profit margins are on a lower basis.

Results so far, despite the pressure on the profit margins, are described as "reasonably satisfactory". The board hope to pay the same 12½ per cent final dividend as last year.

Lapointe Machine Tool Company, of Watford, Herts, have appointed the **Associated British Machine Tool Makers (India) Limited** as agents in India and Pakistan from the start of this month.

The ABMTM will also handle the exclusive agency for the **Lapointe Machine Company,** of Hudson, Massachusetts.

Laporte Chemicals Limited, subsidiary of Laporte Industries, have concluded an agreement with **Peroxidos SA,** of Spain, to provide technical assistance and advice on the construction of an autoxidation hydrogen peroxide plant near Saragossa (Spain).

International Computers and Tabulators Limited and the **Radio Corporation of America** have signed an agreement for the non-exclusive exchange of technical information and patents on data processing.

CEGB CUT RATE FOR NIGHT POWER

THE Central Electricity Generating Board has introduced a cheap night rate for its bulk supplies to the 12 Area Electricity Boards of England and Wales.

Using generating plant to supply power at night when it would otherwise be idle is an important aid to keeping down the overall cost of power.

The CEGB's new tariff, which is to operate from April 1, 1962, is made up of a fixed charge and separate day and night running charges modified by a fuel price adjustment.

In the new tariff the "day" unit charge will be 0.58 pence per unit with a 20 per cent reduction to 0.47 pence per unit for "night" supplies.

Electricity supply costs to the area boards will be raised by slightly over 0.5 per cent by the 1962/63 bulk supply tariff.

In a further attempt to reduce the distance between the peaks and troughs of power demand the area boards will in future find that the demand they have to pay for will not simply be the maximum.

From next April a system related to the full national demand will apply.

£2m. profit for NCB

THE National Coal Board has turned the losses of last year into a substantial profit in the first six months of this year. Half-year figures issued by the Board show a paying interest of £20,738,000 the surplus was £2,600,000.

Last year the loss in the first half of the year amounted to £6,902,000.

This year's half-way profit has been earned despite higher labour costs.

Mineworkers gained a wage increase in January and average total weekly pay for the industry's male workers was £16 16s., against £15 17s. in the first half of 1960.

Export opportunities

LAUNCHES. The Administration Centrale de la Marine et de la Navigation Intérieure, Brussels, four high speed launches for the river police and customs on the lower Scheldt at Antwerp. Closing date, November 8, ESB 25823/61.

LATHES: For the Office of the controller of stores, Sudan Railways, Atbara. Two 8½ in. centre lathes, motor driven, high speed, cab bed, surfacing and screw cutting to these particulars:

- Height over bed, 8½ in.
- Distance between centres (admit) 5 ft. 8 in.
- Swing in gap: 24 in. diam by 12 in. wide
- Spindle speed 9
- Range of spindle speeds about 20 to 1,000 rpm forward and reverse
- Number of automatic longitudinal and cross feeds about 40.
- Range of longitudinal feeds about 0.001 to 0.05 in.
- Range of cross feeds about 0.003 to 0.1 in.
- Range of Whitworth threads —as required with metric conversion
- Motor about 5 h.p.

The machines to be supplied with motor and control gear suitable for operation on 415 volts, 3 phase, 50 cycles, standard equipment comprising sheet steel tray, coolant pump and fittings, thread dial indicator, travelling steady rest, centres and all necessary handles and spanners. Closing date, November 9. ESB 30735/61.

CONVEYOR Belting: The British Trade Commissioner at Melbourne, Australia, has been advised by Marweight Equipment Pty. Ltd., 236-246 Adderley Street, West Melbourne C.3, that they wish to obtain a sole franchise for conveyor belting of British manufacture, on a principal to principal basis. ESB 30653/61.

ROLLED Steel Shapes: Mr. H. C. Blair, plant and product engineer, Hoyt Wire Cloth Company, Abraso Street, PO Box 1577, Lancaster, Pennsylvania, USA, is looking for a British source of supply for rolled high manganese nickel steel shapes. ESB 30589/61.

Inquiries should go to the Export Services Branch, Board Trade, Lucon House, Theobalds Road, W.C.1, before dates given. References (ESB) should be quoted.

FINANCE AND COMMERCE

LEAP IN EXPORTS TO EUROPE

A 14 PER CENT. rise in British exports to the 19 European countries which, with the U.K., formed the OEEC area, was revealed by Sir William McFadzean, chairman of the Export Council for Europe, at last week's Golden Jubilee Export Conference of the British Electrical and Allied Manufacturers' Association.

The rising level of exports achieved in the first eight months of the year reached a total of £870 million earned in the European markets.

For all the improvement in this export sector there were still, according to the Export Council chairman, too many stories of broken delivery promises and lack of service.

Urging the importance of visits by top executives, Sir William declared: "There is really no effective substitute for two people with the power of decision to sit across the same table and do a deal."

Westland to manufacture advanced U.S. helicopter

PRODUCTION of the advanced Boeing-Vertol 107 twin-turbine transport helicopter will be undertaken in Britain by Westland Aircraft following an agreement signed with the Vertol division of the Boeing company

Westland gain the right to provide service support — maintenance and engineering facilities — for the Boeing-Vertol 107 in Britain.

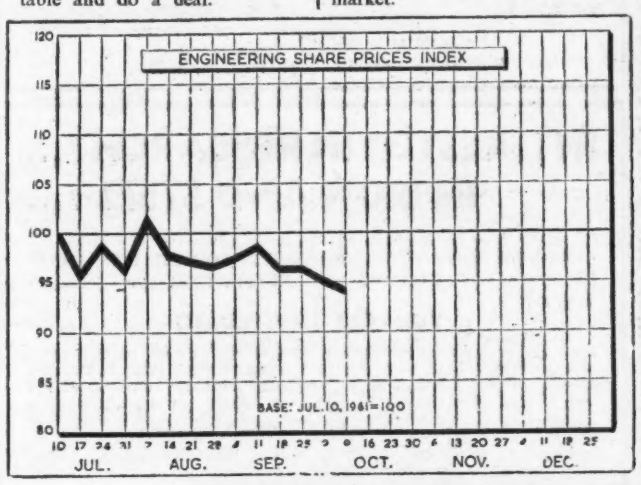
Airline talks have explored the possibilities of a triangular helicopter link between London, Paris and Brussels, and Lord Douglas of Kirtleside, the British European Airways chairman, congratulating Westland on the agreement, has repeated BEA's conclusion:

"The Boeing-Vertol 107 is the most promising machine to meet the urgent need of BEA for an intermediate type of helicopter."

British-made 107s would go at first to the home market, but Westland have their eye on spreading sales overseas.

"There are good prospects in Europe"; a Westland spokesman explained. "The whole of the Commonwealth is a potential market."

Boeing-Vertol 107 prototype at Battersea Heliport, London.



FBI president urges watch on costs

EXHORTATIONS to industry to make greater efforts are not enough to solve current economic problems. Mr. C. E. Harrison, President of the Federation of British Industries, listed U.K. export earnings in recent years in a speech at Leicester last week and went on to assert: "So far as British industry is concerned it has no need to be ashamed of its export performance."

With the deficit in 1960 being caused more by increased imports than by any failure to expand exports and Government overseas spending absorbing virtually the whole surplus on invisible transactions a solution to present difficulties would not be found in exhortations to industry.

"On the other hand there is a growing volume of evidence which indicates that we are not progressing as fast as we should in a world where standards of production and the volume of import/export trades are rising rapidly. It is clear that we are beginning to lose in certain markets because of high costs," said Mr. Harrison.

The Chancellor of the Exchequer had advanced planning proposals, and the FBI president thought that while "preparation of plans" could be useful they wanted consideration given to impediments to production such as the effect of taxation and restrictive practices "in all quarters."

There were many concepts of social and national expenditure accepted now as axiomatic but which should be re-examined. Someone should add the sum of "to go back to the philosophy of Mr. Micawber — income £20, expenditure £19 19s. 6d., result happiness. Income £20, expenditure £20 0s. 6d., result misery."

NSF TAKE OVER SCOTS FOUNDRY

SCOTLAND'S only blackheart and malleable castings foundry, Shanks Ironfounders Limited, of Arbroath, has been acquired by the National Steel Foundry (1914) of Leven, Fife.

National Steel, a subsidiary of Lake and Elliott, of Braintree, Essex, intend to maintain the production of castings and chilled iron pulleys at Arbroath.

ENGINEERING NEWS SHARE PRICES TABLE

1961 High	1961 Low	Stock	Oct. 9	Ch'ge	Y'ld p.c.	1961 High	1961 Low	Stock	Oct. 9	Ch'ge	Y'ld p.c.
47/9	31/9	Allen, Edgar (£1)	32/9	...	8.1	57/-	44/9	Lister, R.A. (£1)	49/3	-6d.	5.6
43/-	28/6	Allen, W. H. (£1)	28/6	...	6.9	51/9	36/6	Mather & Platt (£1)	36/6	-9d.	5.9
77/-	58/6	Angus, George (£1)	65/-	...	6.1	67/-	49/-	Metal Industries (£1)	50/9	-1/9	5.9
31/10½	19/-	A.P.V. (10/)	29/3	+6d.	3.8	71/3	53/4½	Morgan Crucible (£1)	60/3	...	4.6
14/1½	8/10½	Asquith Machine Tool (5/)	11/4½	+1/3	2.1	31/-	20/-	Morris, Herbert (10/)	20/9	-3d.	7.8
48/6	31/3	Assoc. Electrical Ind. (£1)	30/3	-1/-	8.4	52/-	39/6	Murex (£1)	39/9	+3d.	6.4
16/5	11/8	Assoc. Engineering (5/)	12/3	+2¼d.	5.3	49/6	40/6	Neepsend Steel (5/)	45/-	+6d.	5.5
110/-	83/-	Averys (£1)	86/-	...	3.4	31/6	21/9	Newton Chambers (5/)	25/3	+3d.	3.9
36/9	23/9	Babcock & Wilcox (£1)	23/9	...	7.5	41/3	21/3	Parkinson Cowan (£1)	22/-	...	8.0
59/6	40/6	Baker Perkins (£1)	45/3	-1/-	4.9	72/9	47/-	Parsons, C. A. (£1)	49/-	+6d.	5.0
9/7½	5/10½d.	Beyer Peacock (5/)	6/3	-1½d	9.2	40/3	38/-	Plessey (10/)	41/6	+3/6	3.6
77/-	45/-	Birfield (£1)	62/6	-1/-	3.1	33/-	18/-	Pressed Steel (5/)	18/-	...	8.2
102/10½	71/3	Birmid Industries (£1)	75/6	-3d	5.2	25/3	18/6	Qualcast (5/)	20/9	+3d.	4.3
36/10½	20/1½	Birmingham Small Arms (10/)	20/4½	+3d	5.6	38/1½	24/-	Radiation (£1)	24/-	...	8.2
45/6	34/-	Brockhouse, James (£1)	35/9	-3d.	6.9	22/6	14/-	Ransome & Marles (5/)	16/6	..	4.1
28/9	22/2	Broom & Wade (5/)	27/3	-6d	4.0	28/6	22/6	Ransomes, Sims & Jeffs (£1)	25/-	...	6.0
42/6	35/7½	Brotherhood, Peter (10/)	35/9	.	7.1	50/6	34/6	Renold Chains (£1)	41/6	-9d.	4.7
48/9	33/-	Brown, John (£1)	35/-	+3d.	6.2	52/3	38/6	Reyrolle, A. (£1)	38/9	+3d.	4.9
8/6	5/-	Cammell Laird (5/)	5/-	-1½d	.	9/1½	4/3	Richardsons Westgarth (10/)	4/3	-1½d	...
39/6	29/3	Carrier Engineering (5/)	32/3	..	3.8	9/3	5/3	Roberts, Charles (5/)	5/7½	..	...
54/3	36/6	Clarke Chapman (£1)	41/-	+2/9	6.6	48/6	41/10½	Rolls-Royce (£1)	42/9	-4½d	5.1
14/9	10/-	Cohen, George (5/)	10/-	-3d.	6.1	32/6	22/4½	Ruston & Hornsby (£1)	22/9	-6d.	7.7
33/10½	21/8	Coventry Gauge & Tool (10/)	31/-	-1½d	3.9	19/3	14/3	Serck (5/)	14/3	-6d	4.3
12/3	7/10½	Craven Brothers (5/)	7/10½	-3d	5.3	23/9	12/7½	Shaw, Francis (4/)	14/3	..	5.5
24/-	17/6	Crofts Engineers (5/)	19/3	..	4.3	12/-	8/9	Sheepbridge Engrg. (5/)	9/7½	+6d	7.5
39/7½	38/3	Davy-Ashmore (£1)	39/7½	+1/4½	3.4	32/4½	19/1½	Simms Motor (5/)	23/9	...	3.5
70/-	51/-	De La Rue (10/)	51/-	-6d	5.9	44/1½	29/7½	Simon Engineering (5/)	37/9	-4½d	3.6
27/7½	19/9	Delta Metal (5/)	21/6	-3d	4.6	23/9	14/3	Smith, S. & Sons (4/)	14/9	+6d	5.3
68/9	50/-	Desoutter (5/)	55/-	...	3.0	15/3	12/-	Solar Industries (5/)	12/3	...	7.2
41/3	31/9	Dowty Group (10/)	34/4½	+3d.	4.4	45/7½	26/3	Staveley Industries (£1)	28/-	+1/3	8.0
32/10½	22/4½	Edwards High Vacuum (4/)	31/3	+3d.	1.9	32/6	18/6	Steel & Co. (5/)	28/10½	-3d.	3.8
52/-	36/-	Elec. & Musical Ind. (10/)	38/6	+1/6	4.5	67/-	50/-	Stone-Platt Ind. (£1)	50/6	-6d.	6.2
38/-	25/9	Elliott-Automation (5/)	35/1½	+1/10½	1.8	20/4½	14/9	Tecalemit (5/)	16/6	-3d.	5.6
40/6	27/3	English Electric (£1)	27/3	-3d.	7.2	17/4½	13/3	Thompson, John (5/)	13/3	-6d	1.8
37/3	28/6	Firth Cleveland (4/)	29/9	-6d.	4.3	7/-	4/9	Thornycroft, John (4/)	5/6	...	...
39/6	25/9	G.E.C. (£1)	25/9	-6d.	7.9	17/6	11/6	Toledo Woodhead (4/)	15/-	+1½d	5.2
65/-	42/9	General Refractories (10/)	52/9	-6d.	4.7	85/6	56/9	Tube Investments (£1)	56/9	-3/-	4.9
66/6	51/10½	Glenfield & Kennedy (£1)	51/10½	.	7.9	38/4½	27/6	Vickers (£1)	27/6	-2/-	7.2
108/7½	78/6	Guest, Keen & Nettlefold (£1)	88/-	+1/3	3.6	157/6	122/6	Walmsley (Bury) (£1)	130/-	-3/9	3.4
48/7½	26/6	Haden, G. N. (5/)	26/6	-6d.	3.7	84/6	64/6	Ward, Thos. W. (£1)	68/6	-1/6	3.9
16/6	12/4½	Hall-Thermotank (5/)	12/7½	..	4.3	17/9	12/9	Weir, G & J. (5/)	12/9	-4½d	6.9
24/-	15/6	Harland & Wolff (£1)	17/3	.	5.7	47/6	33/-	Wellman Smith Owen (5/)	34/-	-6/3	3.1
33/3	28/1½	Hawker Siddeley (£1)	28/4½	+3d	7.4	14/1½	10/3	West, Allen (5/-)	10/10½	+1½d	6.0
31/-	21/10½	Head Wrightson (5/)	22/4½	+6d.	3.5	46/3	29/3	Westinghouse Brake (£1)	29/3	-3d.	7.4
79/9	51/6	Herbert, Alfred (£1)	65/-	-4½d	4.2	36/6	19/9	Wheelco (5/)	20/3	...	6.6
95/6	77/6	Hick Hargreaves (£1)	77/6	..	5.1	17/-	12/-	Wilmot-Breeden (5/)	14/9	+3d.	3.8
138/9	101/3	Hopkinsons (£1)	121/3	...	4.5	30/-	20/-	Woodall-Duckham (5/)	21/-	-3d.	4.7
25/-	18/6	Howden, James (5/)	20/6	+6d	5.9	44/9	44/6	Worthington-Simpson (10/)	50/-	...	4.9
33/9	23/-	International Combus (5/)	23/7½	+3d	6.2						

IRON AND STEEL

43/6	25/7½	Brown Bayley (10/)	34/9	...	4.5	42/	27/4½	South Durham Steel (£1)	27/6½	-3d.	8.6
81/3	53/1½	Colvilles (£1)	53/4½	+3d.	5.9	47/8¼d.	33/9	Steel Co. of Wales (£1)	35/6	+1/9	7.0
32/3	23/9	Consett Iron (£1)	24/3	+6d.	7.7	57/4½	40/10½	Stewarts & Lloyds (£1)	44/4½	+9d.	6.6
43/7½	26/10½	Dorman Long (£1)	29/1½	+4½d.	6.8	68/7½	43/1½	John Summers (£1)	45/3	-1/1½	6.5
55/1½	39/4½	Firth & Brown (£1)	40/-	-3d.	6.1	55/7½	38/-	United Steel Cos. (£1)	44/1½	-4½d.	5.5
49/10½	31/9	Lancashire Steel (£1)	32/7½	...	6.6	63/6	46/-	Whitehead Iron & Steel (£1)	47/-	...	6.2

The companies whose share prices are quoted in the Engineering table and which form the basis of the Index give a balanced and comprehensive study of the engineering industry. Prices quoted are those at the start of the week. Dus adjustments for Rights and Scrip issues are made. The Index figure is calculated on a National Cash Register Company computer. Prices in the Iron and Steel sections are not included in the Index.

BANK RATE ½p.c. CUT
Credit squeeze goes on

WEEK IN THE CITY
BY OUR CITY EDITOR

STOCK markets were rescued from their lethargy last week by the cut from 7 per cent to 6½ per cent in Bank Rate. The possibility of a small reduction had been freely discussed in the City, but the timing of the change took most people by surprise.

The cut was followed by a brisk advance in share prices, in which many engineering issues participated, though the general pattern of movements remains irregular.

The many other problems overhanging the market, such as tightness of money and continued pressure on profit margins, have yet to be resolved.

A continuation of last week's rally would, in any case find little favour in official quarters.

It is generally conceded that industry is facing a difficult period in the field of labour relations, and if the government's wage-pause policy is to work, a boom on the Stock Exchange is one thing that clearly needs to be avoided.

A further reduction in Bank Rate would be particularly welcome in heavy industry, as it would make it easier for exporting companies to offer competitive terms of credit.

On the company news front the profit warning from Cammell Laird has been followed by a similar statement from the chairman of Doxford and Sunderland Shipbuilding and Engineering.

All the shipyards and engine works will be well occupied in the current financial year, but prices at which orders are now obtainable leave little or no profit margin.

The merger of the two component companies, William Doxford and Sons and Sunderland Shipbuilding, has already produced important results. The directors believe that considerable capital outlay will be called for in the next few years.

NEW Companies

Auto Heating Installations (Dunstable) Ltd., 12 King Street, Dunstable, Beds. To take over the business of heating engineers carried on by **J. R. Wise & Pope.** Nominal capital £1,000.

Kerby Trunking Company Ltd., Launton Works, Bicester Road, Launton, Bicester, Oxon. To carry on business of mechanical, industrial and general engineering, etc. Nomial capital £5,000 in £1 shares.

John Littler (Plant) Ltd. To carry on the business of plant hire specialists, etc. Directors John Littler (permt) and Mrs. Elizabeth Littler, and general engineering, etc. Nominal capital £5,000 in £1 shares.

H. Solley Ltd., 26 North Street, Brighton. To carry on the business of engineers, turners, grinders, welders, etc. Nominal capital £1,000.

These particulars are selected from the daily Jordan's Register, published by Jordan & Sons Ltd., 116 Chancery Lane, London, W.C.2.

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CENTRAL ELECTRICITY GENERATING BOARD

WEST MIDLANDS DIVISION

Applications are invited for the following positions in the Divisional Testing Department with Headquarters at Hams Hall Power Station. The superannuable appointments are covered by N.J.B. service conditions.

(a) Third Assistant Engineer

Scale 13, salary within the range £1,260 to £1,610 (Vacancy No. 264/61 MD)

(b) Fourth Assistant Engineer

Scale 9, salary within the range £920 to £1,245 (Vacancy No. 265/61 MD)

The engineer appointed to post (a) will be concerned with the performance of electrostatic and mechanical dust catching plant in the Division's Power Stations and must be capable of advising on operation. Applicants, who should be suitably qualified, must have experience in this field.

Post (b) which is primarily concerned with the efficiency of all mechanical and some electrical plant in Power Stations should possess suitable engineering qualifications, and experience in efficiency testing will be advantageous.

Applications to be made, quoting appropriate vacancy number, to Mr. W. A. Clement, Divisional Testing Engineer, Nechells Power Station, off Aston Church Road, Nechells, Birmingham, 7, by **23rd October, 1961.**

RTB

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Application forms, which should be returned by 18th October, can be obtained from

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Please quote Ref. No. 202/1a in your letter of application.

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Please write or telephone **WATerloo 4977,** to:

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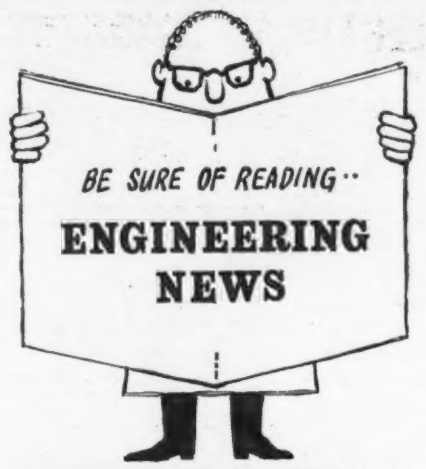

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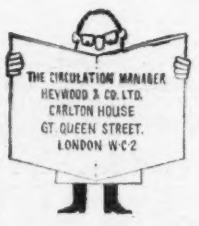

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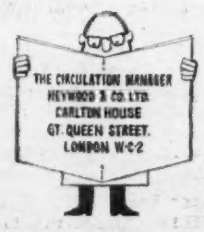

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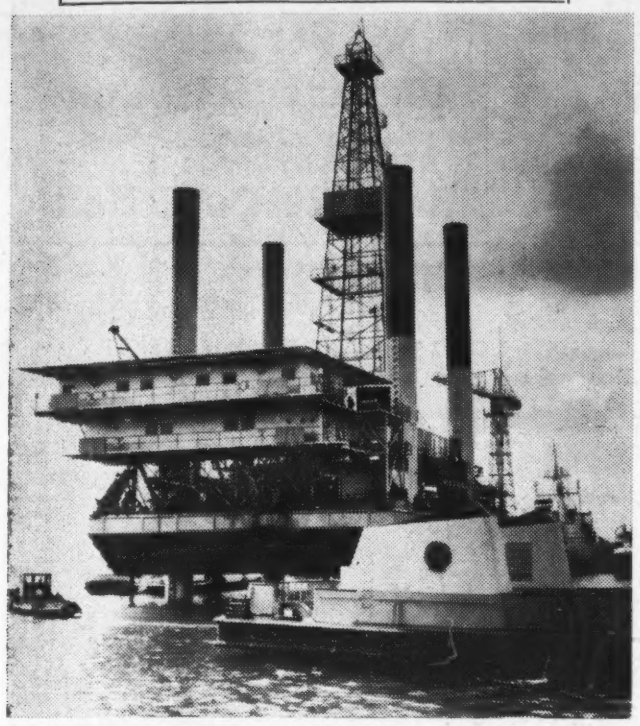
VICKERS EXTEND HEAVY PLANT

6,500 ft. down —still no oil



Triton has a length of 125ft. by 65ft. wide and weighs 2,400 tons.

RESULTS of the first experimental off-shore oil drilling in the North Sea, completed this week, have proved inconclusive. From the technical side, however, the project has been highly successful.

It was after drilling to the scheduled depth of 6,500 ft. that conditions were found to be disappointing in the substrata of the location known as Kijkduin Sea-A.

The drilling took place from the mobile platform Triton, which is operated by N.A.M., a joint venture of the Royal Dutch-Shell Group and Standard Oil Co. (New Jersey).

The Triton will be towed back to the port of Rotterdam within the next few days to be laid up for the winter season. The structure protecting the well head will remain in position.

Drilling will be resumed next year, when weather conditions in the North Sea permit. Meanwhile a detailed appraisal will be made of the data obtained from this first exploration venture 2½ miles from the coast of Holland, between Scheveningen and the Hook.

Power division will manufacture U.S.-designed machines

IMPROVED facilities for the manufacture of power presses and associated equipment have been completed at the Scotswood works of Vickers-Armstrong (Engineers), Ltd., Newcastle-upon-Tyne.

The new Power Press Division will manufacture heavy presses designed by the Clearing Division of U.S. Industries Inc., and be sold in the U.K. under the name British Clearing.

The machine shops handle complete processing of the exclusive variety of components required, from the smallest turned pins to massive welded frabrications, and is one of the best equipped plants in the country for heavy manufacturing facilities.

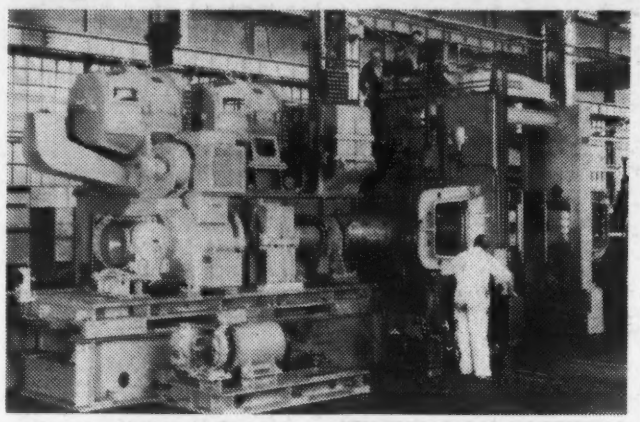
Completed works

Mr. E. P. Cunningham, senior vice-president of the Clearing division of U.S. Industries, Inc., and Mr. A. J. Wardle, Jr., President of the McKay Machine Co., saw the newly laid-out and completed facilities when they visited the works last week.

Vickers-McKay Ltd. was founded in 1958 as a joint venture to manufacture and market products designed by the American firm.

Colville's continuous sheet-steel mill installation at Ravenscraig, Scotland, will contain six large strip steel handling machines by Vickers-McKay which can manipulate and uncoil the material of up to 20 tons in weight.

There is considerable scrap reduction compared with using rectangular sheets when pressing or processing and coiled material is approximately £2 per ton cheaper than sheet.



Part of a Vickers-McKay Uncoiler undergoing shop trials. This machine is designed to accept sheet or strip in coiled form from a conveyor ramp, insert a special mandrel and load the coil on to a special "car" which feeds the material to the input end of a strip mill processing plant.

55-mile long pipeline

The South Durham Steel and Iron Co., one to supply 55 miles of steel pipes for the fresh water system at Kuwait. The town's £725,000 contract, for 24in. and 26in. diameter pipes, is for delivery in Kuwait by the end of the year.

The contract was won against international competition from pipe firms in Japan and on the continent. The pipes will be made at the Stockton-on-Tees Works, of South Durham Steel and Iron Co.

Designer forum

RECENT developments in materials used by engineers are to be an important feature of the second Engineering Materials and Design Conference, to be held at Earls Court from November 13 to 17.

Twenty papers will be represented covering such subjects as steels for low temperature applications, sintered metals, electrical insulating materials and adhesives.

This gives an indication of the wide range of interests to be covered.

Full details can be obtained from Industrial & Trade Fairs Ltd., Commonwealth House, 1-19 New Oxford St., London, W.C.1.

LATE NEWS

● Contd. from p. 1

Tool exports up

are understood to be quoting from 18 to 24 months for delivery.

Notable among the flow of net export business in Europe has been Alfred Herbert's success in selling the larger types of turret lathes.

Associated British Machine Tool Makers Ltd. report a significant increase over the same period last year. Their exports to Japan and South America have increased rapidly in the face of competition from the United States. Significant purchases by Japan have been planers and slotters from Butler Machine Tool, Halifax, capstan and turret lathes from H. W. Ward, Birmingham, and gear planers from J. Parkinson & Son (Shipley).

INDIAN MARKET

The traditional British market in India is buying a greater volume of their machine tools including various grinding machines from Churchill Machine Tool, Manchester, lathes from John Lang & Sons, Johnstone, and plano-milling machines and screw cutting machines from Kendall & Gent, Manchester.

Export order books for the Machine Tool industry in July, 1960, were worth £21.2 million, 29.4 per cent of the home order book; in this July export orders had risen to £30.3 million, 35.5 per cent of the value of home orders.

The most recent figures from the Machine Tool Trades Association show that while new export orders in July were up to £4.3 million against £3.2 million in July, 1960, new home orders fell from £10.7 million in July last year to £7.9 million this July.

DEVICE TRIPLES ENGINE POWER

A DEVICE claimed to triple the horsepower of an internal combustion engine has been perfected by Nihon University professor Yukichi Asakawa. This invention was completed with the aid of engineers from the Nissan Motor Company, Ltd., of Yokohama.

It will be industrially applied in the near future, with patents already applied for in the United States, the U.K., West Germany, France and Italy.

Dr. Asakawa's scheme is to insert an electrode separate from the orthodox spark plug into the cylinder and then apply an alternating current of about 10,000 volts.

99cc experiment

He experimented with a 99 c.c., two-cycle gasoline engine and managed to realise increased revolutions from 2,000 to 3,100 per minute.

The invention is also stated to have additional advantage of reducing the carbon deposits within the cylinder because of the engine's higher degree of combustion. Too, it is claimed to consume only about 10 per cent more fuel than the conventional type of engine.

Dr. Asakawa explained the principle of his new engine device by noting it was his belief that various particles in neutral flames inside an engine when subject to high-voltage electricity, are ionized into plus or minus particles to repulse or attract one another, and the resultant swirls of flames and better mixing of air makes for improved combustion.

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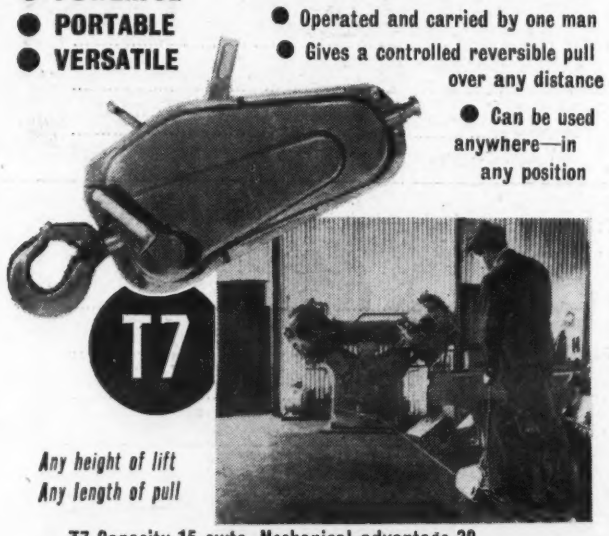

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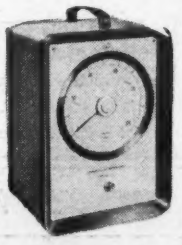

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